SERVICEMANUAL

ESCOM

MONITOR

DX-17F

Contents:

1. Features 1

2. Specifications 2

3. Recommended Input Signal 3

4. Block Diagram 5

5. Controls 6

6. Description of Circuits 10

7. Trouble Shooting Guide 25

8. Detailed Alignment Procedure 35

9. Measured Waveforms 40

10. PCB 46

11. Electrical Parts List 51

12. Exploding Diagram 54

13. Circuit Diagrams 55

1. Features

DX17F is the new generation of color display. It has the following features:

(1) Digital control:

(a) User friendly digital controls for screen adjustments.

(b) Memory for 8 user display modes.

(2) Power saving system:

DX17F is so-called a green product that makes DX17F be more friendly to our environment. DX17F is able to conserve 75% of power in Suspend Mode and more than 95% of power in Off Mode.

(3) Wide range of horizontal frequency input from 30 ~ 64 kHz. Vertical frequency input from 50 ~ 100 Hz.

This range makes the DX17F compatible with video standards from VGA to XGA. It also has a 100 MHz video bandwidth.

(4) Autoswitch power supply, from 90 ~ 132 Vac or 180 ~ 264 Vac

It makes DX17F accept all kinds of AC supply anywhere in the world.

2. Specifications

Picture Tube

17" 0.26mm dot pitch

Resolution

1280 x 1024 max.

Display colors

Unlimited

Scanning frequency

Horizontal: 30 ~ 64 kHz

Vertical: 50 ~ 100 Hz

Power saving system

Power saving mode	*Maximum Power consumption*
On	120W
Suspend	30W
Off	5W

Display area

300 x 220

Video bandwidth

100 MHz

Input signal

Video: analog 0.7 Vp-p on 75 Ohm load

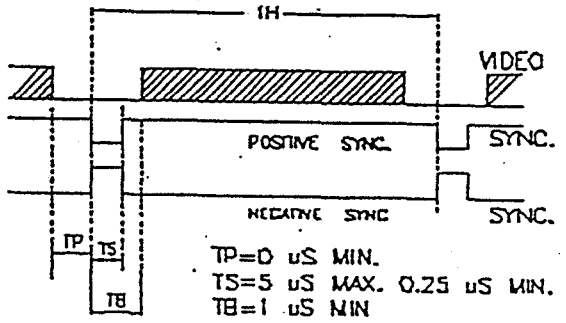
Sync: separate or composite, positive or negative, TTL

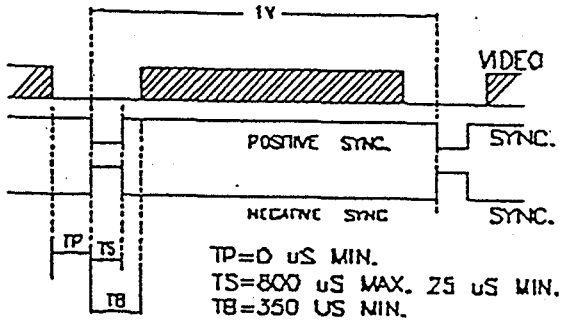
Power Input

90 ~ 130 Vac or 180 ~ 260 Vac autoswitchable

3. Recommended Input Signal Timing

RECOMMAND TIMING:SEPARATE SYNC.





3.1 Pin Assignment

The pin assignment of the video cable is listed in Table 3.1. This is for your information only; please do not attempt to devise your own connections as this may damage the monitor..

1	Red
2	Green
3	Blue
4	Ground
5	No Connection
6	R-Ground
7	G-Ground
8	B-Ground
9	No Connection
10	Ground
11	Ground
12	No Connection
13	H-Sync (Composite sync)
14	V-Sync
15	No Connection

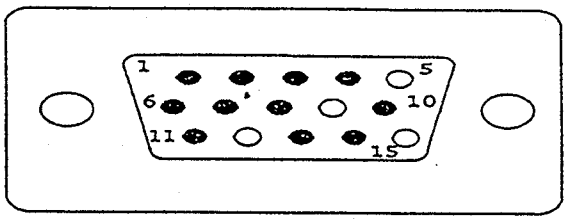


TABLE 3.1

4. Block Diagrams

4.1 Monitor Block Diagram

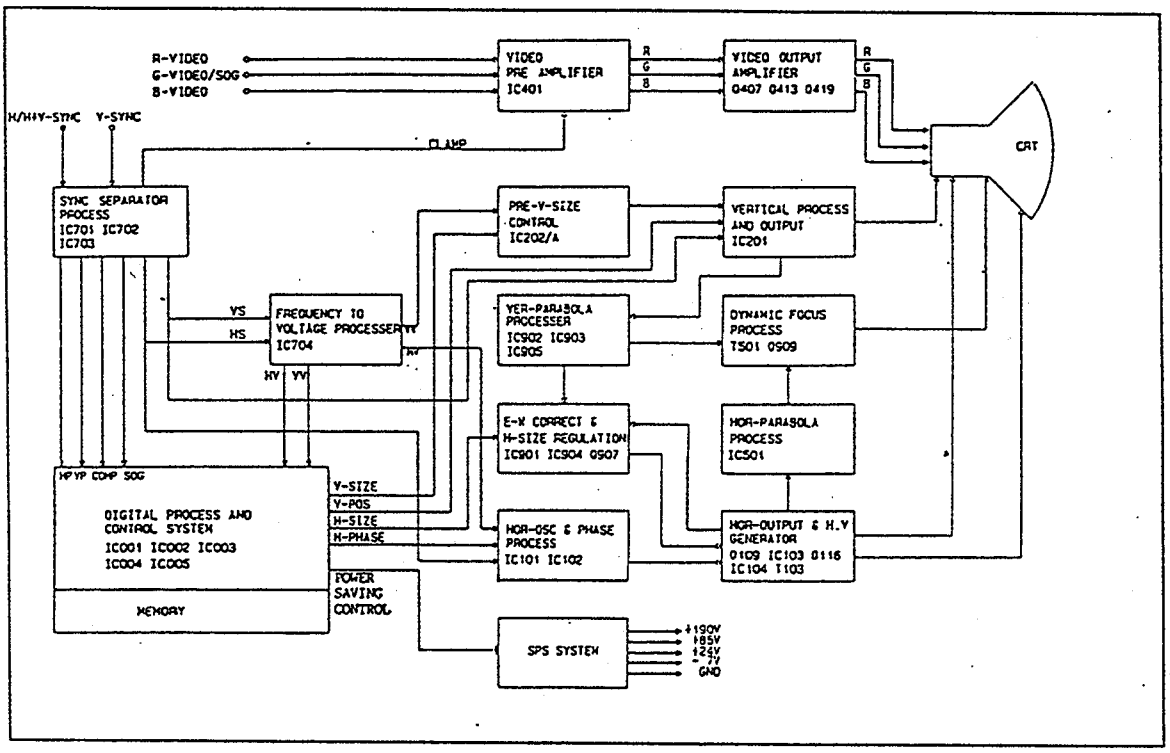


Figure 4.1

4.2 Switching Power Supply Block Diagram

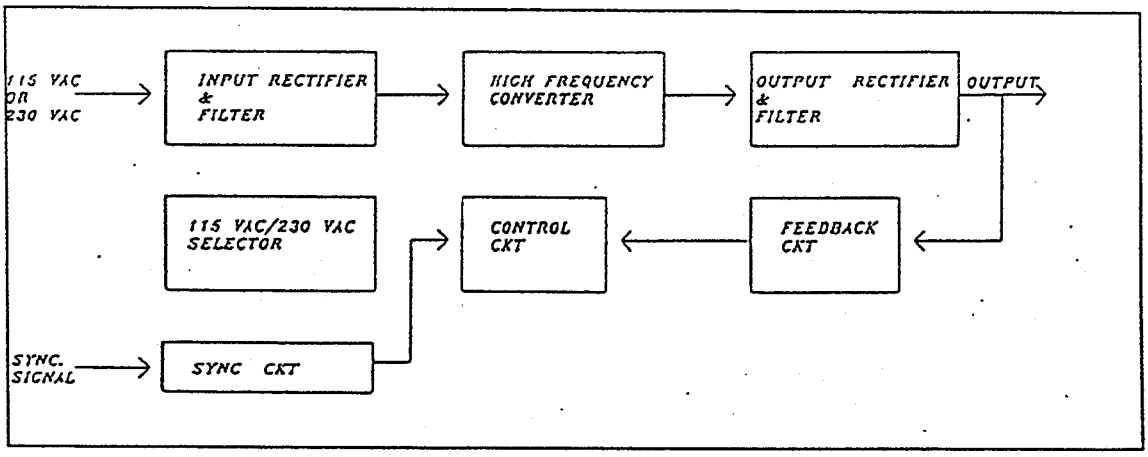


Figure 4.2

5. Controls

There are a few switches, indicators and User Adjustable Controls on the DX17F. These provide the user a way to maximize the display to his or her preferences. A description of their functions is presented as below.

5.1 Front Panel Controls

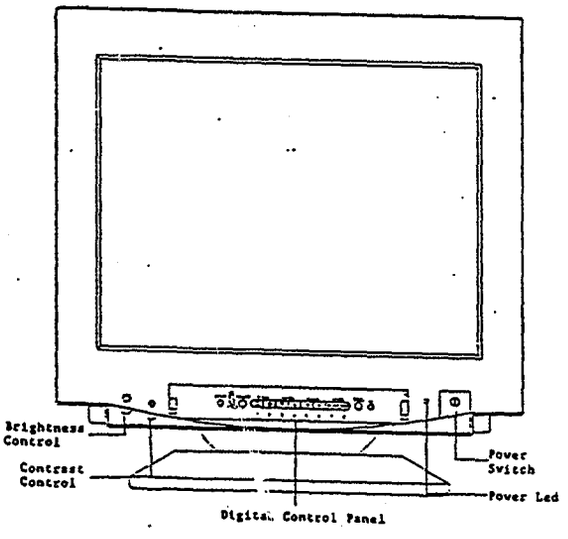


Figure 5.1

1. Power Button

Press this button to turn the power ON or OFF. There will be a 2 second delay before the display appears.

2. Power LED

Since DX17F has Power Saving Utilities, under different mode of the power management the LED displays differently to show which mode is active. When the On mode is active, the LED indicator goes green in color. It will become orange when the Suspend mode is activated. Whenever it enters into the Off mode, the LED indicator will remain orange and begin flashing alternatively.

3. *Brightness Control*

This dial allows you to adjust the brightness level of the display screen. Rotate this dial clockwise to increase brightness; counter clockwise to decrease brightness.

4. *Contrast Control*

This dial allows you to adjust the contrast of the display screen. Rotate this dial clockwise to increase contrast; counter-clockwise to decrease contrast.

5.2 *Digital Control Panel*

The digital control panel is concealed behind the hinged door. Push at the arrow to open the hinged door and reveal the digital control panel.

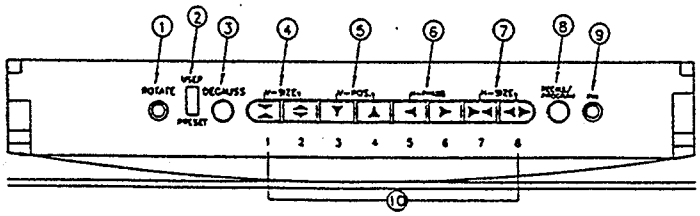


Figure 5.2

1. *Rotate Control*

The rotate control can be used for fine adjustment of image tilt.

2. *Preset/User Selector*

This selector toggles the monitor between Preset or User status of operation.

3. *Degauss Button*

The button manually degausses the CRT.

4. *Vertical Size (V-Size) Controls*

Press ⧖ to decrease the vertical size (display height); press ⧋ to increase the vertical size.

5. *Vertical Position (V-Pos) Controls*

Press ▽ to shift the display down; press △ to shift the display up.

6. *Horizontal Phase (H-Phase) Controls*

Press ◁ to shift the display left; press ▷ to shift the display right.

7. *Horizontal Size (H-Size) Controls*

Press ⋈ to decrease the horizontal size (display width); press ◁▷ to increase the horizontal size.

8. *Recall/Program Button*

When the Preset/User selector is set to Preset, this button acts as the recall button which recalls the factory default settings. When the Preset/User selector is set to User, this button acts as the program button. The user may program the present display mode as any one of the unused User modes, or overwrite a previous programmed User mode.

9. *Pincushion Control*

The pincushion control can be used to adjust pincushion or barrel distortions.

10. *User Mode Buttons #1 through #8*

Besides the functions mentioned above, the 8 digital screen format control buttons also act as the User Mode Selection Buttons #1 through #8 when the monitor is being programmed in the User Status.

5.3 *Rear Panel Controls*

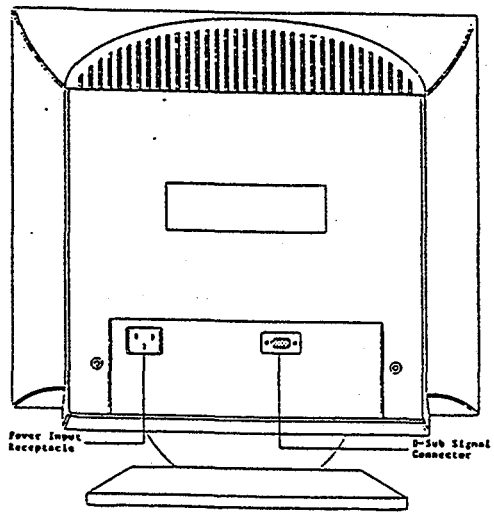


Figure 5.3

1. Power Input Receptacle

This receptacle accepts the female end connector of the supplied power cord. Attach the power cord to this receptacle, then plug it into a properly grounded AC or PC outlet to supply power to the DX17F.

2. Signal Connector

The DX17F has a 15-pin mini D-sub connector which should be attached to your video display adapter.

6. Description of Circuits

6.1. Sync Board

ξ Sync Process Circuit

In order to keep the monitor be able to work on signal of different frequencies and modes, the input signals shall be processed to make sure that the signals to the next sections will be independent of the input signals.

This process is divided into two parts :

- Horizontal sync process circuit
- Vertical sync process circuit

Horizontal Sync Process Circuit

The input horizontal signal is sent to the pin 12 of IC701/D. The circuit of R703 and C702 is used to ensure that the output pulse always remains positive pulse, independent of the polarity of the input signal. In addition , it is an integrated circuit which level will be transmitted to CPU as a control signal. The output from the pin 11 of IC701/D goes along two paths, one is to IC701/B and the other one is through the circuit that consists R705, C703, R707, C704 and IC701/C. R705, C703, R707, C704 and IC701/C are combined together to be able to extract the vertical sync signal if it is a composite sync signal. If the input signal is horizontal sync signal only, the output from the pin 8 of IC701/C will be at LOW that makes the output from the pin 5 of IC701/B be considered as LOW. Therefore, the output is dependent on the pin 11 of IC701/D which is the horizontal sync signal at that moment. On the other hand, if the input is a composite sync signal, then the output of IC701/D will consists of horizontal and vertical sync signals and the output of IC701/C is the vertical sync signal at that time. Consequently, the output of IC701/B will also be the horizontal sync signal only because of the characteristic of a XOR gate. The output of IC701/C is also submitted to IC702/C which works as a buffer. The output of IC702/C connects R717 to produce a control signal. Moreover, it also connects R716 to act as a vertical sync signal to the Vertical Sync Process Circuit when it is a composite

sync signal. R717 controls Q704 to make its collector to be at HIGH LEVEL during separate sync signal and to be at LOW LEVEL during composite sync signal. The level of Q704's collector controls IC702/A and IC702/B. Such that the CLAMP pulses will be positive H-sync pulses during separate sync signal while they will be negative during composite sync signal.

Vertical Sync Process Circuit

The input vertical sync signal, from W403's VS is sent to the pin 2 of IC701/A through Q702 which functions as an inverting buffer. R713, C706 and the pin 1 of IC701/A make the output of IC701/A be a positive vertical sync signal. R713 and C706 is an integrated circuit that gets different level corresponding to the different input vertical sync signal. Besides determining the output of IC701/A, that level will also submitted to CPU as a control signal. The output of IC701/A goes into two paths, one is to the pin 12 of IC702/D, another is through a circuit composed of D702, R714, R715 and Q703 to generate a control signal. The base of Q703 will be at HIGH LEVEL with the separate sync signal so that the pin 13 of IC702/D always remains at LOW LEVEL and the output from the pin 11 of IC702/D will be the same as the pin 12. When it is a composite sync signal, the output of IC701/A will be at LOW LEVEL that makes the pin 12 of IC702/D and the base of Q703 also be at LOW. Then, the output of IC702/C that is a vertical sync signal then will be submitted to pin13 of IC702/D to make the output from the pin 11 of IC702/D is still a vertical sync signal as the same as its pin 13.

In order to clarify the differences between the separate input sync signal and the composite one. The reactions of several points that we have discussed above in the Sync Process Circuit are presented in TABLE 1.

Type	*IC 701 pin 11*	*Q 704 collector*	*IC 702 pin 8*	*IC 701 pin 3*	*Q 703 base*	*IC702 pin 11*
Separate	*Hor. Sync*	*HIGH*	*LOW*	*Ver. Sync*	*HIGH*	*Ver. Sync*
Composite	*Comp. Sync*	*LOW*	*Ver. Sync*	*LOW*	*LOW*	*Ver. Sync*

✞ Hor.Sync : horizontal sync signal only.
Comp. Sync : composed of horizontal and vertical sync signals.
Ver. Sync : vertical sync signal only

TABLE 1

ξ *Frequency to Voltage Converter Circuit*

Processed Sync signals are not only transmitted to Oscillation Circuits as triggers but also sent to Horizontal conversion at IC704/B and Vertical conversion at IC704/A by means of a Frequency to Voltage converter. As the DC voltages after the conversion are required to be highly stable and accurate, time constants at the pin 10 and pin 6 of IC704 are set to H≅ 14 us and V≅ 8 ms, respectively. Those specific values are achieved by adjusting VR701 and VR702. Then DC levels are generated at HV+ and VV+ after the RC filtration. The DC levels are transmitted to CPU for frequency detection. Moreover, they are also sent on purpose to accomplish H-Phase compensation, Horizontal frequency tracking as well as H-Size and V-Size compensation.

When there are not horizontal and vertical signals, the pin 10 of IC704/A and the pin 6 of IC704/B will be at LOW LEVEL. Then, the circuit that contains R723, R724, Q705, D703, and D704 will sent a fixed voltage to prevent the horizontal width and vertical height of the monitor from being too small.

ξ *Horizontal Oscillation Circuit*

Horizontal Sync pulses (H-SYNC) are inputted to the pin 1 of IC101. Besides providing the horizontal oscillation which is the vital part of the horizontal deflection circuit, IC101 also comprises Sync delay, AFC, X-ray protective functions, etc. The pin 2 is connected to Q101 to W102 for external H-Phase control while pin 3 is for phase pre-setting by adjusting VR103. The Hor-O/P pulses feed back the pin 4 for AFC (Automatic Frequency Control) while pin 7 is the AFC compensation circuit. Pin 5 generates triangular waves where C109 is the factor of charge & discharge the timing. Pin 6 is DC level for the reference of pin 5. Pin 8 is the source of the horizontal oscillation while VR102, R118, C113 decide the frequency.

If the horizontal frequency scans from 30Khz to 68Khz, there must have an automatic tracking circuit to hold the I/P frequency accurately. There are two paths to control the H-Phase at the pin 2 externally. IC102/B gets reference voltage from horizontal frequency/voltage converter to change the H-Phase according to the frequency of the Horizontal Sync. In addition, CPU can submit different LEVEL according to different timings to change the H-Phase via Q101. On the other hand, IC102/A and Q104 together combine a tracking circuit where tracking voltage is decided by VR101. D102 (Yellow LED) acts as a Zener diode to indicate if the frequency is too high. Pin 9 is a discharge circuit of horizontal oscillation. Pin 10 is B+ (12V) and Pin 11 decides the H-duty cycle by the radio of R120/R121. The High/Low ratio is set to 6:4. The horizontal drive output (HD) of the pin 12 will transmit through a output stage that is formed by Q105 and Q106 to other circuits.

ξ *Horizontal Frequency Switching Comparator*

During horizontal scanning, both the linear coil and the capacitance for S CURVE compensation must be adjusted to different values according to the frequencies, so IC705, LM339 comparator, is used in the circuit. The inverting input terminal of each comparator connects with the control point from the horizontal frequency to voltage converter while the non-inverting input terminal is set to a reference voltage in order to compare with the HV+. The higher the frequency is, the higher level of HV+ will be. When HV+ LEVEL is superior than the reference voltage, the output will be at LOW LEVEL. The reference voltage values of IC705/B, IC705/C and IC705/D are presented as below :

IC705/B : 43 KHZ
IC705/C : 51.5 KHZ
IC705/D : 62.5 KHZ

ξ *H-Parabolic Waves Generating Circuit*

The generation of the horizontal parabolic waves is described as the following :

The input signal from the AFC of W101 is sent to the horizontal sawtooth generating circuit that is composed of Q511, R516 and C509 through Q506, which works as a buffer. The saw-toothed waves are through Q508 that acts as a buffer to IC501/D, C514 and R539 to generate the corresponding parabolic waves. The parabolic waves are amplified to be about 14 Vp-p after passing through IC501/C, Q510, Q509 and R532. The amplitudes of the parabolic waves will change when the horizontal frequency changes. In order to make sure the amplitudes of the output to be stable, we sample from the pin 14 of IC501/D via a half wave rectifier that contains IC501/A and D507. IC501/B, R525 and R528 are for amplifying and rectifying the voltage to control the base of Q507 such that we can change the amplitudes of the saw-toothed waveforms, therefore, we are able to maintain the amplitudes of the parabolic waves to be the same at all times.

6.2 Main Board

ξ 12V, 5V, -5V, -0.4V Voltage Regulator Circuit

W702 is an input terminal of the power supply. The input 24VDC is converted to 12VDC by the regulator circuit that is combined with R757 and IC706. The 12VDC provides the power supplies for other circuits on the MAIN BD and parts of circuits on the POWER BD. On the other hand, the power supply for the -5VDC voltage regulator circuit is from the -7VDC of W702. IC202/B, Q706, R764, R763 forms the -0.4VDC voltage regulator circuit, which power supply is provided by the -5VDC and +5VDC.

ξ Vertical Deflection System

IC201, being the main part of the vertical circuit, composes of OSC, PRE-AMP and Driver O/P. This circuit is typically a vertical application circuit. Pin 3 is for oscillation where ZD201 is used to change the oblique of the oscillator, in order to allow the oblique to increase smoothly. In the circuit, the vertical linear adjustment is at VR201 while vertical height adjustment is at VR203. R208, the damper resistor, is used to decrease the Q value of the V-DY to avoid the oscillation. Both R207 and C209 are for filtration of HF noise. R201, C211 and R212 for AC feedback while R211 and R212 for DC feedback are used to stablize the features of the amplifier. D203 and C205 constitute a Boost circuit to provide 2-fold B+ voltage during the retrace period, therefore, the time required for retrace is cut down to save the power consumption.

There are two ways for external adjustment of the V-Size. The reference voltage supplied by aforesaid VV+ is used for presetting the V-Size while IC202/A and Q201 function to change the value of the sink current along according to the Vertical Frequency to correct the V-Size. In addition, the V-Size is changed by CPU which sents different Level to the base of Q202. Consequently, the change of sink current controls the V-Size. The external adjustment of the V-Pos is achieved by changing the DC level at V-DY that depends on what degree IC203/B conducts. However, the working condition of IC203/B, which changes the bias of Q203 and Q204, is determined by the vertical output.

ξ *Pincushion Circuit*

The deflected sawtoothed waves, which IC201 generates, are transmitted to the parabolic wave generating IC, IC905. The input of IC905 is the pin 3. The input with different LEVEL will cause the corresponing phase shifts of the parabolic waves. Consequently, adjusting VR902 can change the phase of the parabolic waves. The pin 12 outputs a parabolic wave with the vertical frequency. IC902/B acts as the buffer that makes the parabolic waves be able to drive the next stage of circuits. During the retrace time, there exists a pulse in the produced parabolic waves. Since this pulse will cause a defective condition in the Horizontal Deflection Circuit, we need to remove this pulse. We solve this problem by using IC902/C to produce a DC LEVEL to bias the parabolic waves. We can adjust different DC LEVEL by tuning VR903.

ξ *Pulse Width Modulation (PWM) Circuit*

Since the Horizontal Deflection Circuit is made up by diode modulation circuit, it is necessary to change the pincushion modulation to the pulse width modulation (PWM) as our control method.

The rectified parabolic waves, generated by IC905, are fed to the non-inverting input terminal of IC904 and act as the reference point of the pulse width modulation. On the other hand, the circuit that contains C916, R956, Q912, C920, R955, Q913, Q902, R911, D902, C901, R960, R958, R959, Q917 and the pin 8 of IC905 will generate the saw-toothed waves with the horizontal frequency. These saw-toothed waves are submitted to IC904 to compare with the parabolic waves with vertical frequency at the pin 2 and output the pulse modulated waves. Let us study the control of the width of the pulses. A controllable DC LEVEL from CPU is sent through IC901/A and IC901/B to adjust the range of DC LEVEL. The circuit, composed of Q901, R947, C914 and D901, is applied to clamp the amplitudes of the saw-toothed waves to control the width of the pulses, In other words, we are able to adjust the width of the horizontal size.

ξ *Pincushion Compensation Circuit for Parallelogram*

Since the deflection pincushion compensation circuit can only makes the symmetric adjustments for trapezium, pincushion and barrel distortions, we need to improve the distortions, caused by parallelogram and to keep the phase between each side to be same. So, we implement these by an extra circuit. We let the vertical parabolic waves pass to the amplifier circuit , composed of R235, R236, C221, Q207, R239, VR204 and R240. Adjusting VR204 can make the output to

be either positive or negative. At the same time, the vertical saw-toothed waves from the Vertical Deflection Circuit are also fed a amplifier that contains R228, C220, Q206, R231, VR205, R232, R242 and Q208 where VR205 can be tuned to obtain a either positive or negative output. At that moment, the adjusted parabolic waves will compose with the saw-toothed waves after passing through Q208. Afterwards, the composite wares will be sent to the pin 6 of IC101. Consequently, we can adjust any direction of the pincushion.

ξ DC to DC Loop Circuit

To ensure a stable high voltage working under different frequencies, we need different voltage supplies. DC to DC loop circuit is required to change voltage supply that depends on the frequencies.

A sample signal is fetched from the Horizontal Drive Circuit. The circuit that consists of C141, Q120, C140, R190, Q121, R191, Q122, R194 makes the sample signal be a about 3-us delayed trigger signal first. And then the signal is sent to trigger IC104,LM555. R156, C142 and the DC LEVEL of IC104's pin 5 result the horizontal duty cycle of the output for the HIGH LEVEL to be fixed. Q114, Q115, C145, T102, C146, R159, ZD105, Q116 are applied for switching the 190V voltage from the output of the Power BD circuit. When it is at HIGH LEVEL, Q116 will be ON that arises its output to be 190V voltage. In Contrast, it will be open at LOW LEVEL. The circuit, composed of D116 L105, C147, functions as a filter. Therefore, different DC LEVEL that depends of frequencies will be sent to FBT circuit. However, the voltage supply required by FBT and its different loads will cause changes in the Hi-voltage. So, we take a DC voltage from the pin 9 of FBT circuit to feed back the pin 6 of IC105/B via R172, VR105, R171 to compare with the reference point of IC105/B's pin 5. The output from the pin 7 of IC105/B will be sent to the pin 5 of IC104 via R162 to change the DC LEVEL that changes the HIGH LEVEL period of the output of IC104. ZD108 keeps the voltage of IC105 's pin 7 under a limitation that prevents the horizontal transistor from being destroyed by the excessive Hi- voltage. When we switch on the machine, all circuits will be under an unstable condition. R157, D114, C144, Q112 assemble together to make up a protective circuit. This circuit lets the DC LEVEL of IC104's pin 5 rise gradually that makes the Hi-voltage also increase gradually. ZD701, R768, R769, Q711, R770, R771, Q712 and R772 prevent the horizontal transistor from being destroyed by the unstable state, caused by switching off the machine. They make the Hi-voltage drop down quickly after turning off the machine.

ξ X-RAY Protection Circuit, Vertical Retrace Covering Circuit and Spot Killer Circuit

X-RAY Protection Circuit

When the Hi-voltage is over the safety standard of CRT, the X-RAY protection circuit will make the Hi-voltage slow down. The LEVEL of Hi-voltage, from the pin 14 of the FBT, is transmitted through R173, VR106, R165 to the Pin 3 of IC105/A. Then, it will be compared with the reference voltage, 6V at pin 2. If the Hi-voltage is high enough, IC105/A will generate an about 12V voltage as its output. This 12V voltage will make the IC101's output slow down.

Vertical Retrace Covering Circuit

When the electronic beam reaches the bottom of the screen, it has to return to the beginning of the first line to start another cycle of scanning. During this time that is so-called vertical retrace, there are several retrace lines on the screen. In order to cover these lines, the circuit, which contains with R511, C506, Q504, R509 and C505, will attach a retrace pulse on G1. So the retrace lines will be invisible to achieve a better picture. Generally, the control range for G1 is from -40V dc to -60V dc that can be changed by adjusting VR503.

Spot Killer Circuit

After we switch off the monitor, the deflection circuits will be off. However, the Hi-voltage cannot lower down instantaneously. Thus the electronic beam will cause a spot at the center of the CRT. Spot Killer Circuit functions for covering this spot. C504 charges instantaneously after switching off that makes Q514 be off since the voltage difference between the base and the emitter is too small. However, +12VDC will cut down quickly after switching off that makes the voltage difference be high enough to conduct Q514 then. When Q514 is ON, C504 will discharge through R508 and R507 that results in the base voltage of Q505 higher than its emitter. Then, Q505 will be OFF. At that time, G1 will increase from about -50V to -190V that covers the electronic beam.

ξ *Horizontal Deflection and Diode Modulation (PWM) Circuits*

The horizontal drive signal from the output of IC101 is sent to C120, Q107, T101, R160, R179 to drive the horizontal deflection transistor Q109. However, it is necessary to have a different drive current when the width of the horizontal size changes. So, the DC LEVEL of the H-Size, which the CPU controls, is applied to control the voltages across R133, R134. IC106/A amplifies the DC GAIN. Q108 functions as a voltage regulator to supply the operating voltage for the drive circuit. C134 and H-DY construct the LC oscillation for the horizontal deflection circuit while Q109 and D108 act as switches. H-DY produces a current that is either positive or negative. Since H-DY is a coil, when a current flows across it, a magnetic field will be generated. The generated magnetic field changes the flowing direction of the electronic beams of the CRT. In addition, the LC oscillation circuit also includes D109, C137, L104, L106, D108, Q109, D108 as well as the FBT transformer. The supplied voltage from D109, C137 , L104 and the supplied voltage from D108, H-DY, C134 generate a voltage difference between H-DY and C127. While the PWM circuit changes its being ON period, it also changes the voltages of D109, C137 and L104. So, the voltage difference between H-DY and C127 can be adjusted. This voltage difference changes the currents of H-DY that changes the deflection magnetic field, therefore, the size of Horizontal Size can be adjusted at that time. On the other hand, while Q109 is off, C134 discharges that produces an about 940Vp-p pulse at the collector of Q109. The pulse generate a magnetomotive force in the Pin 3, 2, 1 of the FBT transformer. Thus, different amplitudes of pulses will be produced at the primary and secondary coils of the FBT transformer. So, different DC voltages can be generated. However, the horizontal deflection current may have a horizontal linear problem caused by different frequencies and the curve of the current. In order to compensate the horizontal linearity, different situations match different frequencies. Under 43kHz, Q111, RL101, Q119, and Q110 will be conducted. At the same time, C127, C129, C130 and C156 are all in parallel that forms the equivalent capacitance Cs. L102 will be the equivalent linear coil. When the frequency is between 43KHz and 51.5KHz, Q111 and RL101 will be off. Moreover, the equivalent capacitance Cs will equal to C127, C130 and C156 in parallel. The equivalent linear coil will be L102 and L103 in parallel at that time. When the frequency is over 51.5KHz but under 62.5KHz , Q111, RL101 and Q110 will be off. CS equals to C127 and C156 in parallel while the linear coil equals to L102 and L103 in parallel. When the frequency is over 62.5KHz, CS equals to C127 and the linear coil still equals to L102 and L103 in parallel. In conclusion, the higher the frequency is, the lower the equivalent linear coil and Cs will be.

ξ ABL Circuit & Dynamic FOCUS Circuit

ABL Circuit

The ABL circuit is used to limit the VIDEO amplitude when the brightness of the VIDEO is over the current specification of the CRT. When the brightness of the CRT increases, the current of the Hi-voltage load will also goes up. At the same time, the current that flows through R501 and C501 will also increase so that the voltage of R501 becomes higher. When the voltage difference between the base and the emitter of Q501 gets enough large, Q501 will be ON. Afterwards, the emitter voltage of Q502 decreases as the voltage across R502 goes down. Since the emitter of Q503 is connected with the control points of VIDEO GAIN, the DC LEVEL is lowered that controls the gain of the VIDEO and makes the brightness energy be stable and then CRT current no longer increases.

Dynamic FOCUS Circuit

The Dynamic FOCUS Circuit is applied for the compensation of the four corners, caused by the insufficiency of the FOCUS voltage. The horizontal parabolic waves, taken from the SYNC BD, and the vertical parabolic waves, produced by IC905 are gathered to be amplified and sent to the FBT transformer to compensate the FOCUS voltage. After passing through C517, R538 and T501, the amplitudes of the horizontal parabolic waves will be amplified up to about 15 times. Afterward, they will be sent to the output of the amplifier circuit for the vertical parabolic waves to synthesize a modulating parabolic waves, in which the vertical parabolic waves as the envelope while the horizontal parabolic waves as the carrier. The vertical parabolic waves are AC coupled to the base of Q911 from C909. Q911 functions as an inverting amplifier.

6.3 Video Board

ξ Video Pre-Ampifier

The major function of IC401, the pre-amplifier, is to amplify the analog video that is 0.7Vp-p to TTL Level signal before further process. For the video ,there are three channels that are R, G and B, respectively. Since these channels have the same configuration, the following description will only cover the green signal. The green video signal couples to IC401 via C403. The clamp signal, which is taken from the H-sync in the Sync Process Circuit, is amplified inversely by Q401 and transmitted to the pin 14 of IC401 for clamping. The pin 12 is for the video gain control. After the output passes through D403 to Q417, which is an emitter follow, it will be transmitted to next stage.

ξ Video Output System

The green video signal, amplified by the Pre-amplifier, is transmitted to Q418, Q419, Q420 and Q421 for further amplification to drive the CRT. R458 and C433 compensate the fall time of the video. The output signal couples to the cathode (CRT) through C435 while adjustment of VR406 can regulate the video bias. Q402, Q403 and Q404 assemble a circuit for H-Blank rectification. Such blanking signal is transmitted to the amplifier's emitter of each R, G and B gun for blanking.

6.4 Power Board

ξ Power Supply Operating Theory

1. The power supply of DX17F is an off-line fly-back type switching power supply. The line input is 90~132Vac or 180~264Vac auto-selectively. There are totally 4 major outputs: 190Vdc, 85Vdc, 24Vdc, 5Vdc, -7Vdc, in which 190Vdc is the major one. The total output power is 90W approximately.
   The maximum loads of the outputs are:

190Vdc	3A
85Vdc	0.1A
24Vdc	0.5A
5Vdc	0.3A
-7Vdc	1A

2. Input rectifier & filter:
   (a) EMI line filter, which consists of T302, T303, C337, C336, C335, C301, performs to reduce the electromagnetic interference.
   (b) TH302 reduces the surge current.
   The basic block diagram of DX17F power supply operation is shown as below:
   (c) When input voltage is in 90~132Vac range, the 115/230Vac auto-selective circuit makes the ac line charge C301 and C302 through 2 diodes (D301 and D304) of the bridge diode, showed as in figure 6.1.

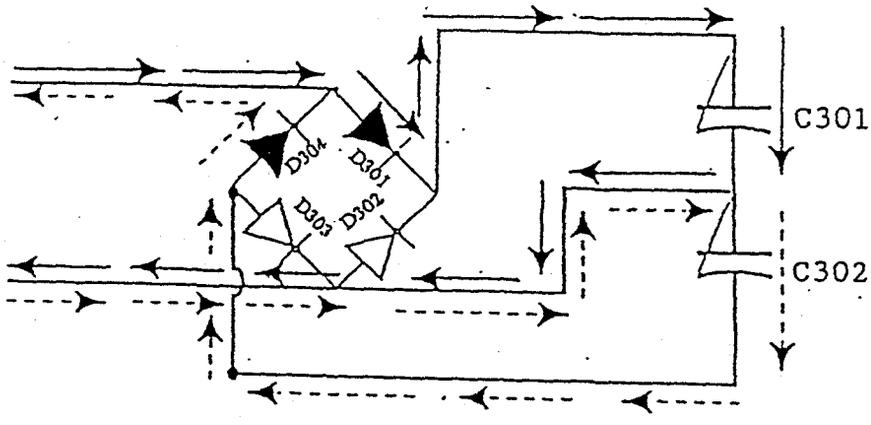


Figure 6.1

(d) When the input voltage is in 180~164Vac range, the 115/230Vac auto-selective circuit makes the loop bridge rectified. It is a standard full wave rectifier then, showed in Figure 6.2.

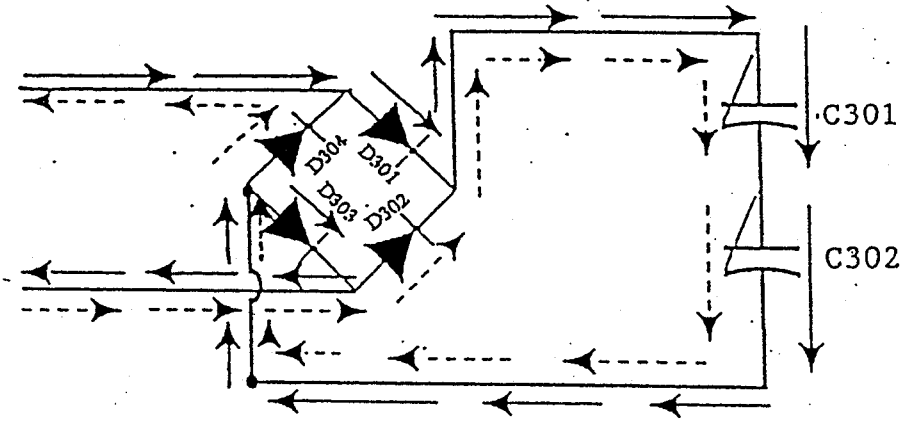


Figure 6.2

3. 115/230Vac auto-selective circuit: This circuit checks AC input voltage in either 90~132Vac or 180~264Vac. Then it determines IC304 to be at "ON" or "OFF" state. If the input is in 90~132VAC range, IC304 will be "ON" and the result is described in 2-(c). If the input is in 180~264Vac range, IC304 will be "OFF" and the result is described in 2-(d).

4. High frequency converter: it consists of T301, Q301,...,etc. The fly-back converter (T301) stores energy in the primary winding as Q301 is ON. On the other hand, it dumps into the secondary winding as Q301 is Off.

5. Output rectifier & filter: its configuration is shown in Figure 6.3.

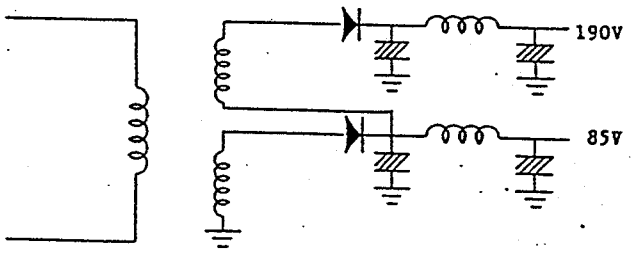


Figure 6.3

6. Feedback circuit: tuning VR301 can adjust the 190Vdc output voltage. The opto-coupler IC302 is applied to couple the feedback signal from the output duty cycle to IC301. Thus, it stablizes the output voltage.

7. Control circuit: the major component is IC301 which is a P.W.M. IC.
   (a) The feedback signal is sent to IC301 to control the duty that stabilizes the output voltage.
   (b) R319, C315 control the frequency of IC301 during unsync. With sync signal, the frequency of the IC301 must be higher than the free run frequency of IC301.
   (c) Short or overload protection: It consists of R311, R312, C305, IC301's pin 3, etc. They are grouped as a current limited circuit. When the output is overloaded or shorted, the current of the primary winding of T301 will be increased considerably that makes the peak voltage of R311 also increase. This increased voltage runs through R312 to the pin 3 of IC301. When it amounts over 1V at the pin3 of IC301, IC301 will turn OFF that makes the output be OFF accordingly.

8. Degaussing circuit: It is composed of RL301, TH301, C320, R334, R339,... etc. When the power switch is ON or the degauss switch is pressed, the degaussing circuit will be active for about 4 seconds.

9. 5V voltage generated circuit: It contains T060, IC060, R068, VR060 and D064, where VR060 can adjust the error term of the output voltage. The generated 5Vdc provides the power supplies for the HV+ and VV+ circuits of the SYNC BD., the digital processor and control system circuit of the MAIN BD. as well as the power supply for the -0.4Vdc voltage regulator circuit.

ξ *Power Saving Operation*

There are three modes of Power Management of DX17F when the power is switched on. They are **On Mode, Suspend Mode** and **Off Mode**, respectively. The control signals from the CPU are transmitted to the power saving system to determined which mode the monitor adopts. Control signals A and B are from the IC001 pin 30 and pin 31, respectively. We will discuss these three modes separately.

On Mode

When it is On mode, both control signals A and B will be HIGH. D066 and D067 act as an And Gate that makes the pin 1 of IC061 be HIGH at that moment. The pin 2 of IC061 will be LOW then since it is an inverted IC. The LOW of the pin 2 makes both the pin 4 and pin 6 be HIGH that drive both Q064 and Q065 to be ON. Q063 and Q066 operate as switches that Q063 will be ON at that Mode

while Q066 will be OFF as the collector of Q065 is LOW at that time. The LOW of the pin 2 also connects to the pin 11 that will control the color of the LED indicator to be green then. On the other hand, D071 and D072 operate as an Or Gate that makes Q068 ON and the collector will be LOW that makes IC062 will be OFF then. Consequently, the monitor works normally.

Suspend Mode

When the Suspend Mode is activated, either signal A or B will be HIGH. As we mentioned above, D066 and D067 form an And Gate that makes the pin 1 of IC061 be LOW then. As a result, Q063 will be OFF that cut down the 24V power supply. Moreover, Q066 will be ON that will drag down the HI-voltage. D071 and D072 combine as an Or Gate will control the IC062 be OFF just as the On Mode. The LED indicator will become yellow in color that is controlled by the state of the pin 8 which is at HIGH then. The monitor will power down and the maximum power consumption the this mode is 30W.

Off Mode

When the Off Mode is active, both signals A and B will be LOW. Since the operations of Q603 and Q066 will be the same as the Suspend Mode, we are not going to discuss here. However, the base of Q068 will be at LOW then since signal A and signal B are LOW. As a result, IC062, which connects with the pin 1 of IC301, will be ON that affects the control circuit of the power supply. Besides this, As C069 charges and discharges through R077 periodically, the LED indicator will not only remain yellow in color but also flash. The maximum power consumption of the Off Mode is under 5 W.

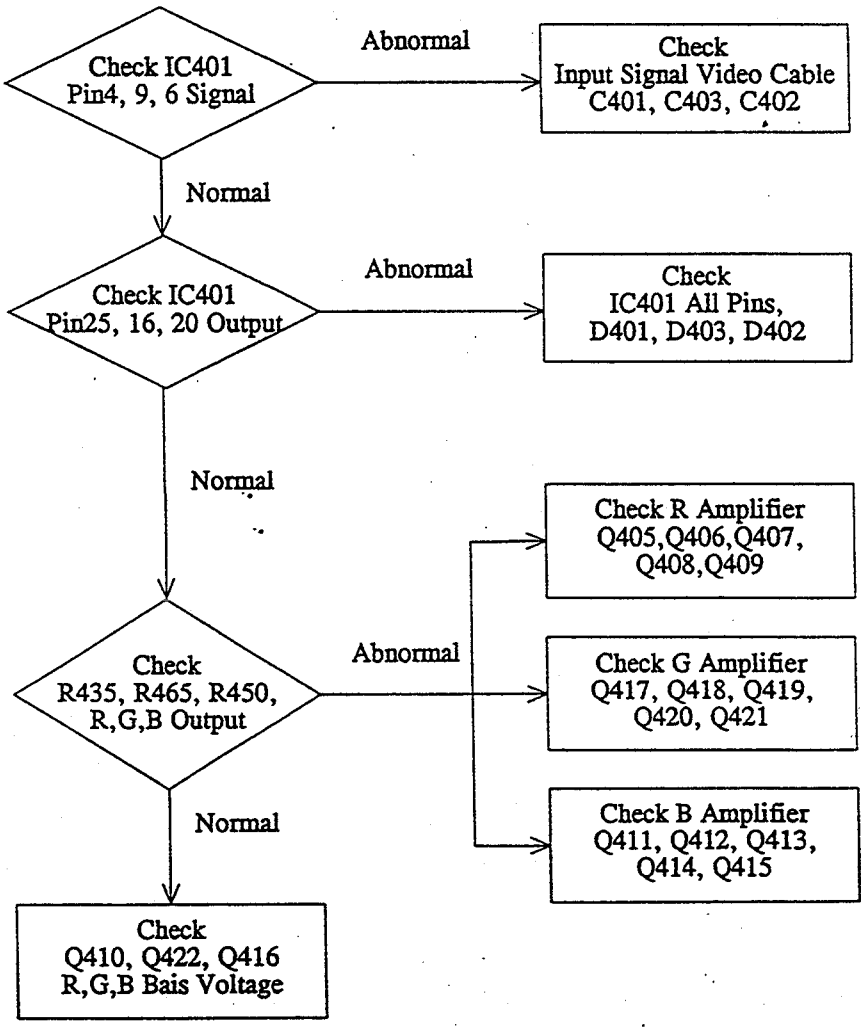
In order to have a clearer view of the power management of DX17F, several crucial points' states will be showed in TABLE 2.

mode	*A*	*B*	*IC061 pin1*	*IC061 pin4,6*	*Q063*	*Q066*	*The base of Q068 and Q067*	*IC062*	*Power Led*
On	HIGH	HIGH	HIGH	HIGH	ON	OFF	HIGH	OFF	green
Suspend	LOW	HIGH	LOW	LOW	OFF	OFF	HIGH	OFF	yellow
Suspend	HIGH	LOW	LOW	LOW	OFF	OFF	HIGH	OFF	yellow
Off	LOW	LOW	LOW	LOW	OFF	OFF	LOW	ON	yellow with flashing

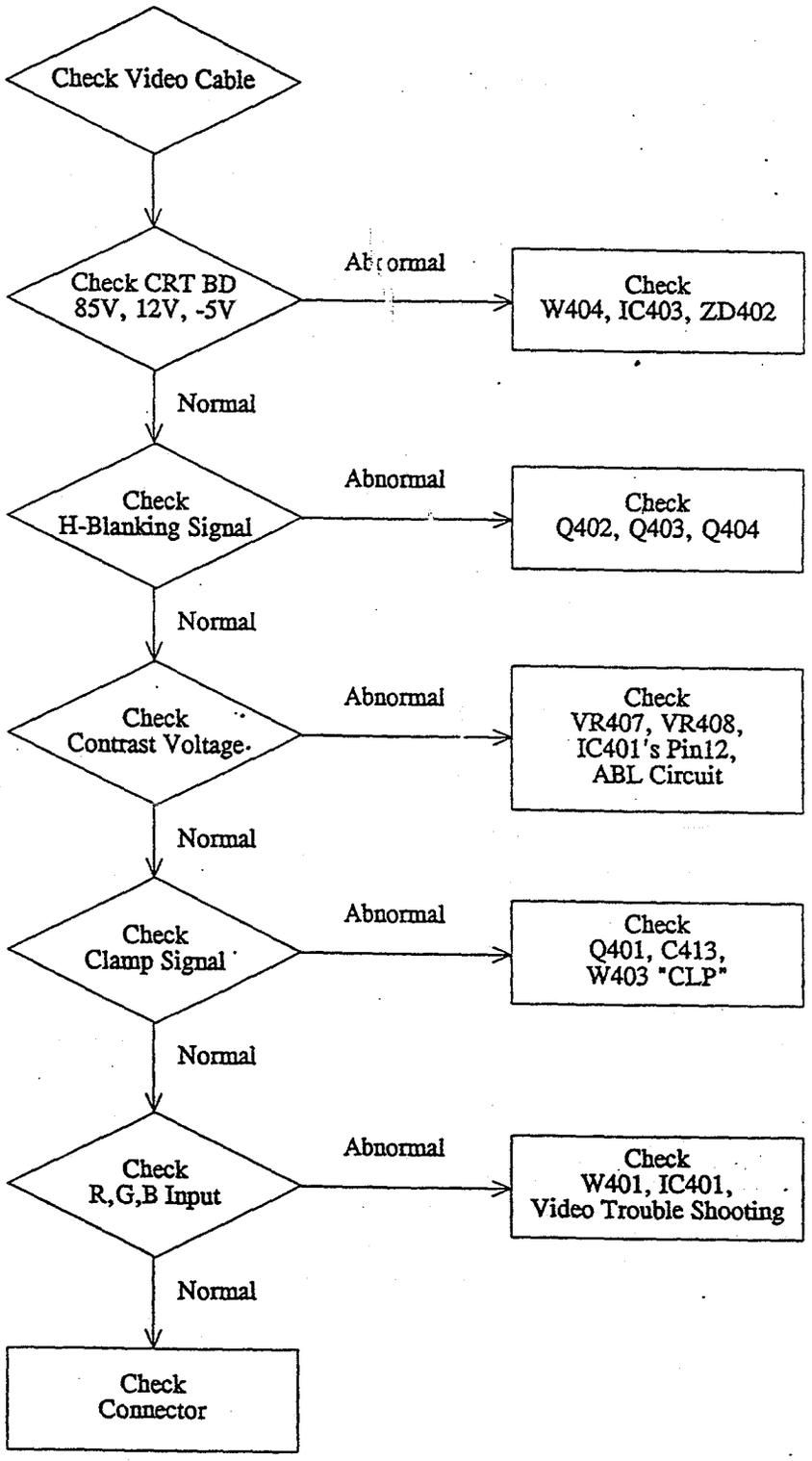
TABLE 2

7. Trouble Shooting Guide

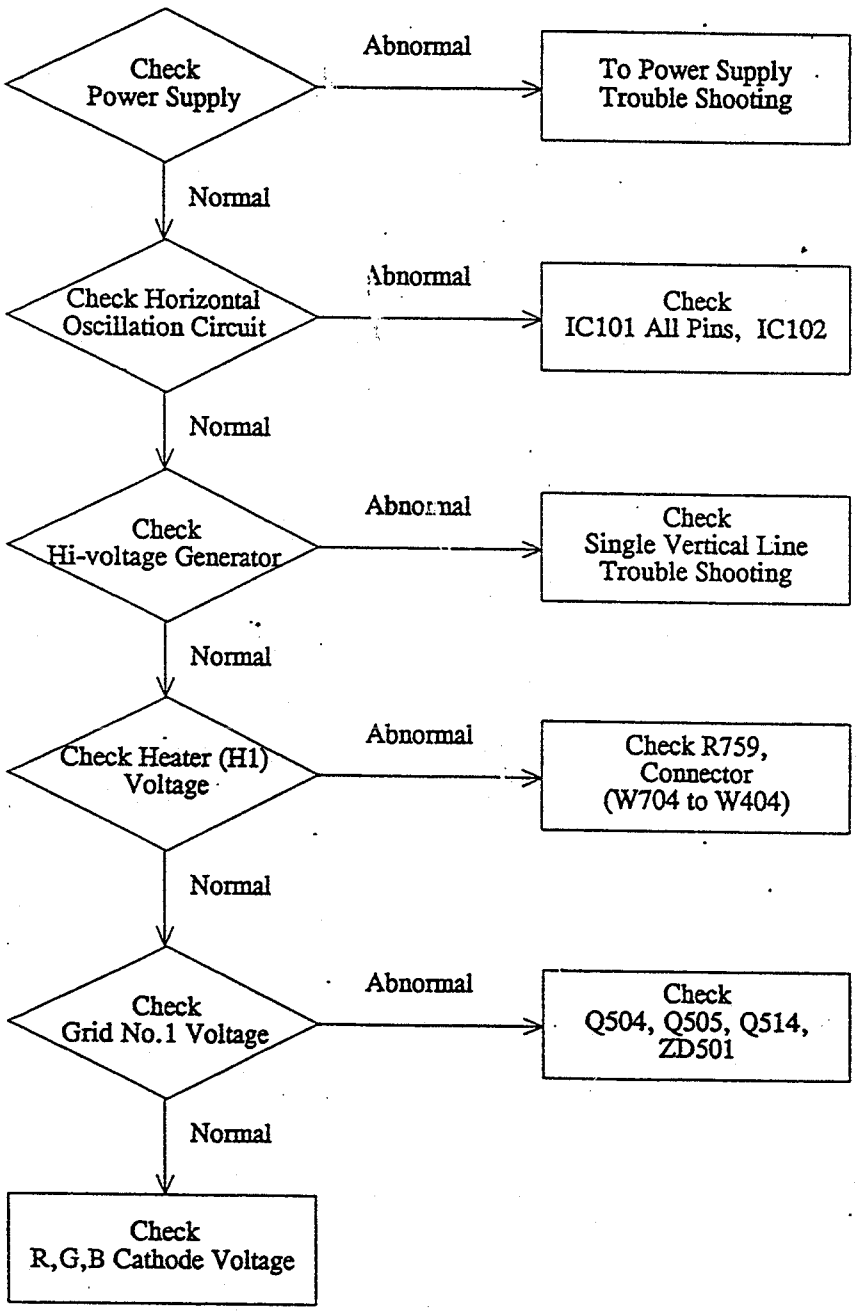
Video no R, G, B color



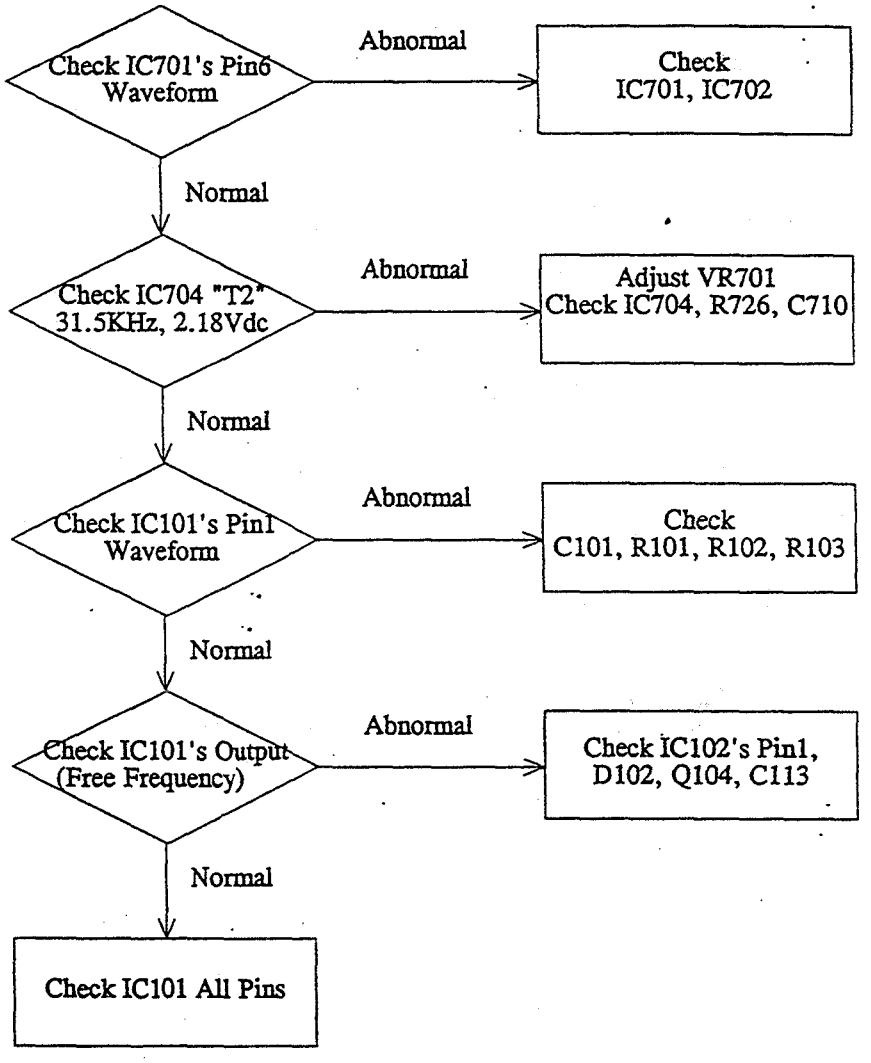
Video does not appear



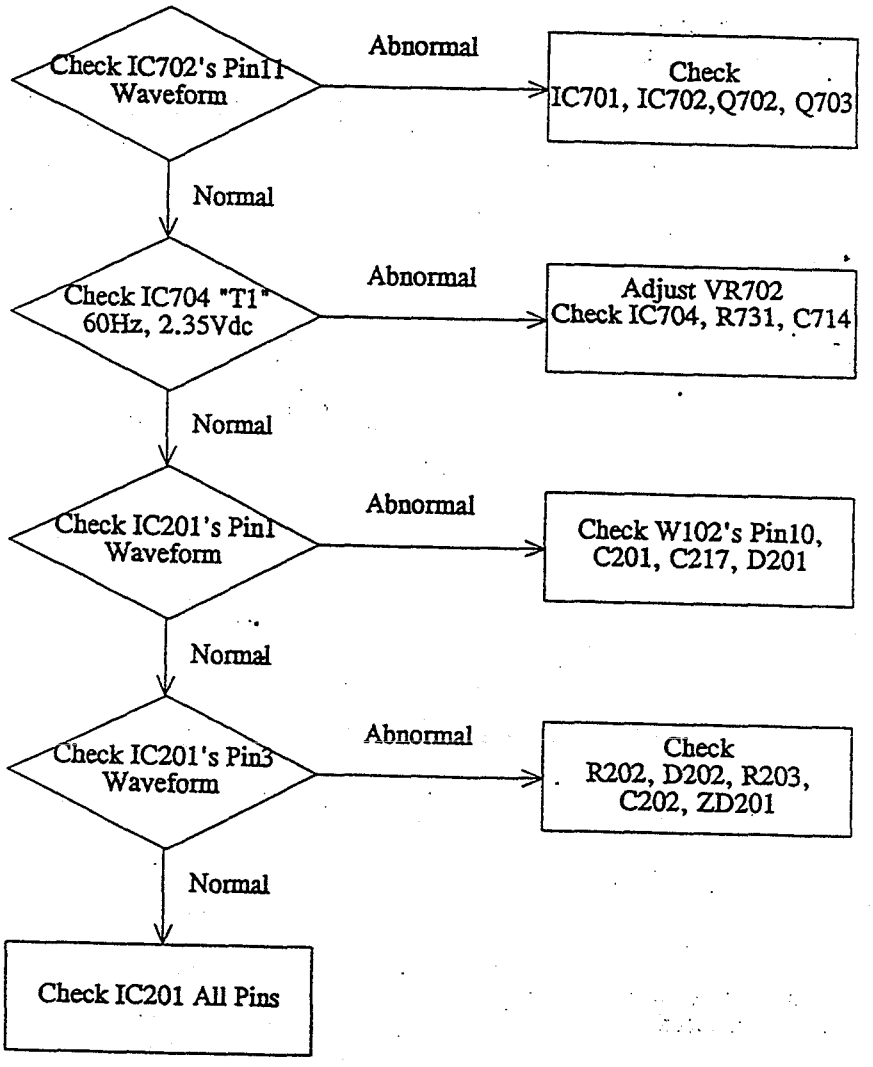
Raster does not appear



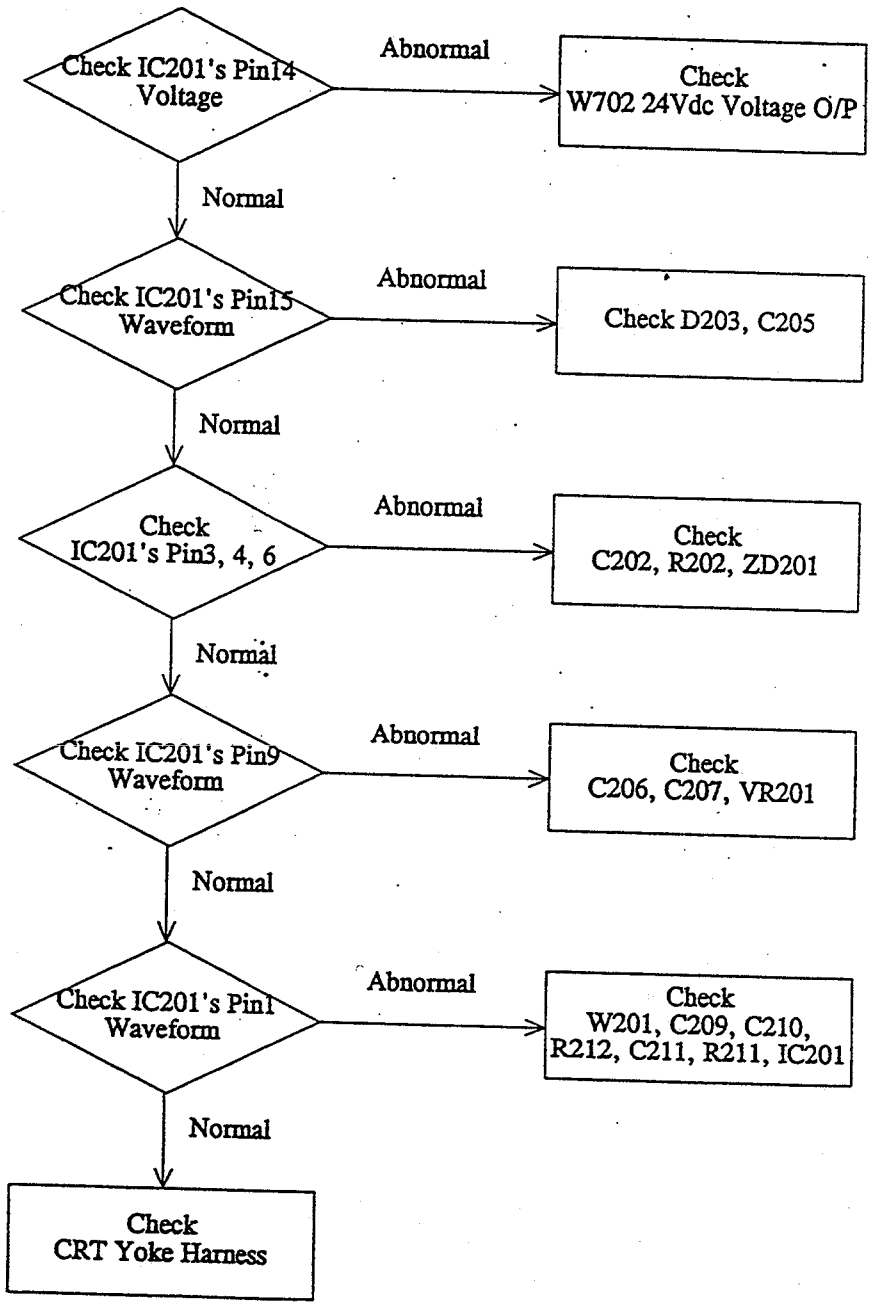
Horizontal cannot synchronize



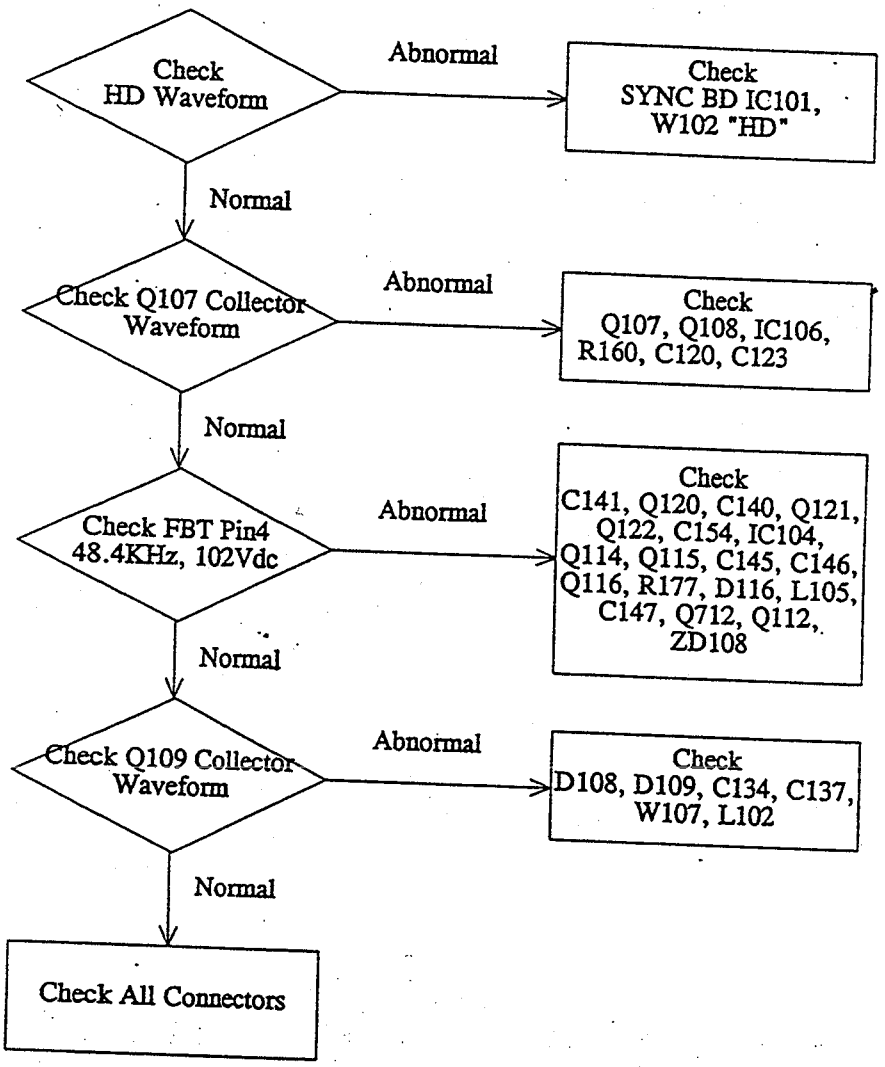
Vertical cannot synchronize



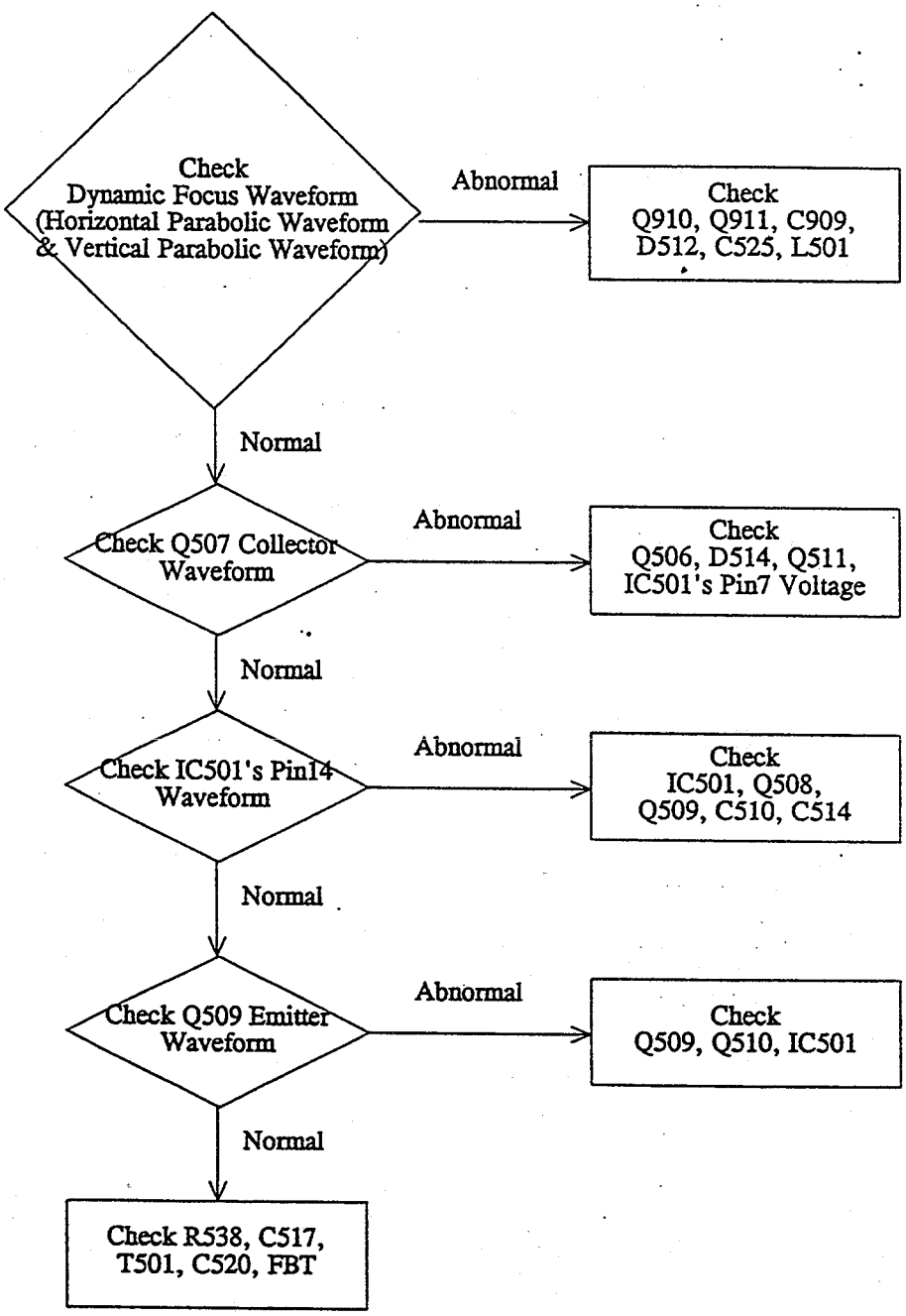
Single Horizontal Line



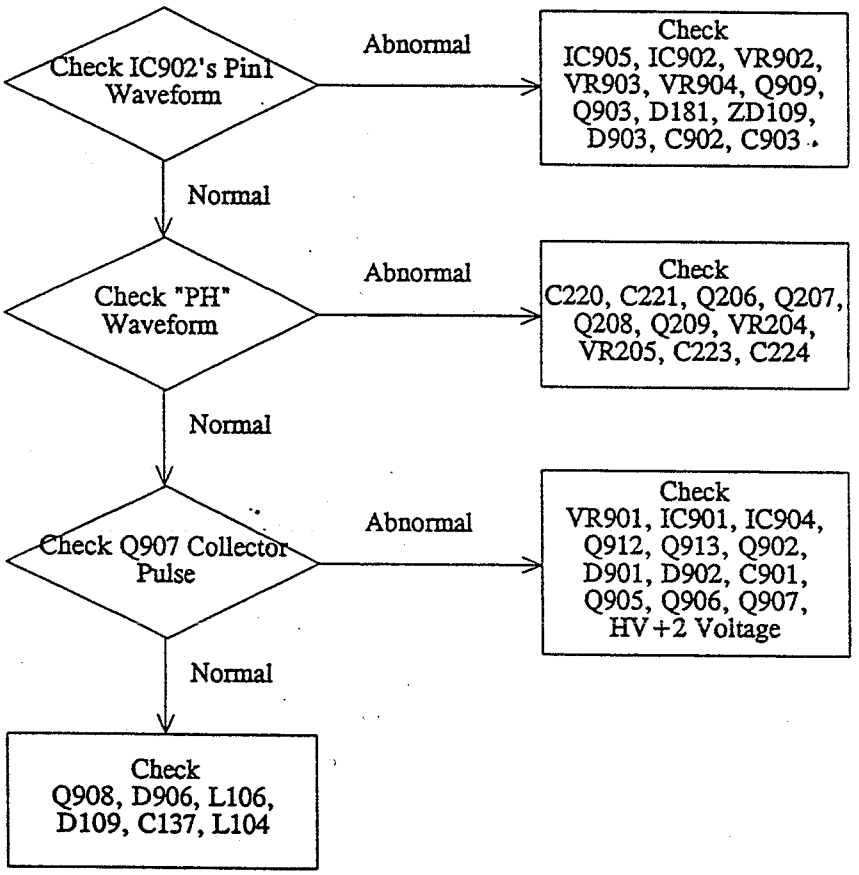
Single Vertical Line



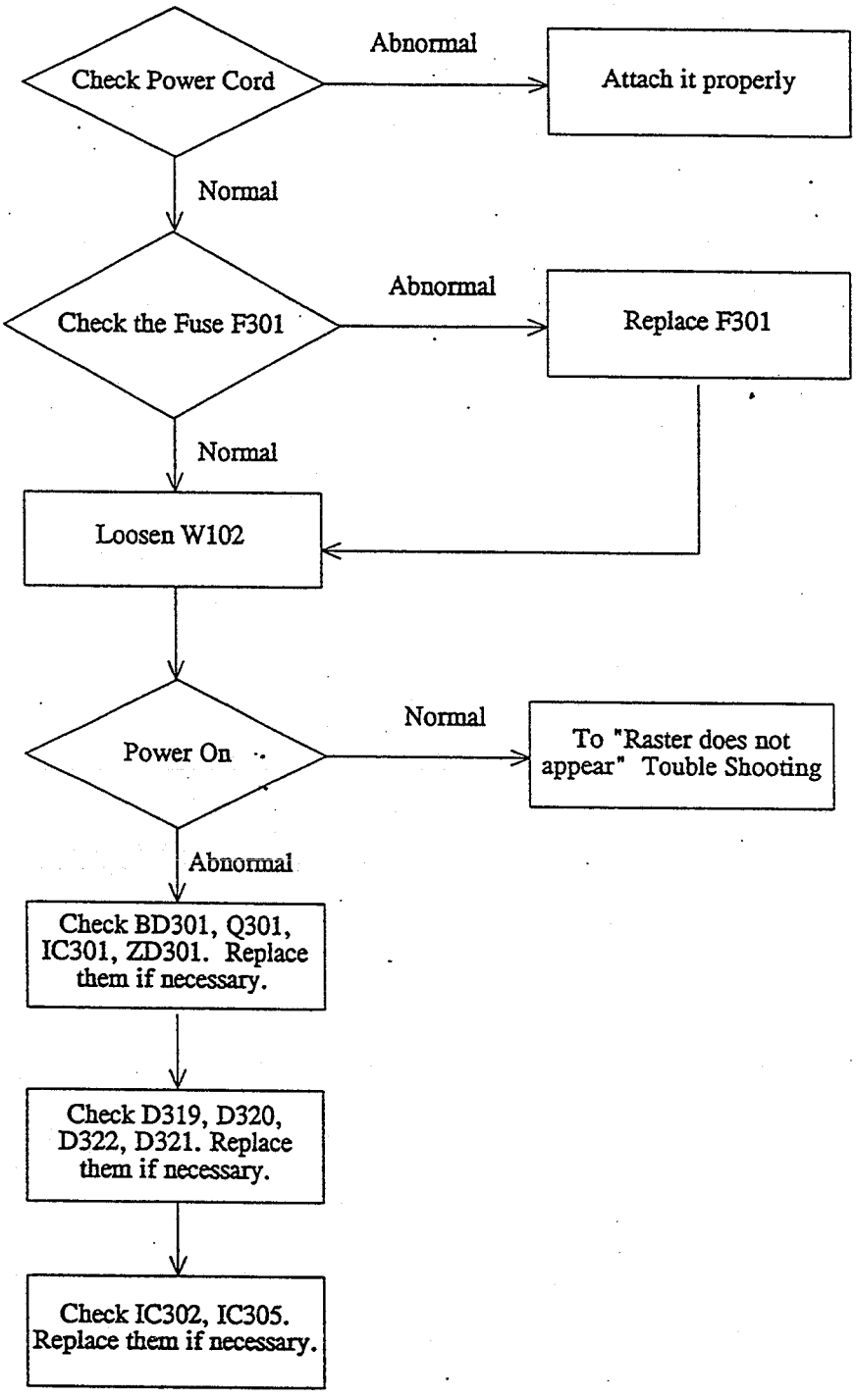
Dynamic Focus Fair



Pincushion & Distortion


Check IC902's Pin1 Waveform
Abnormal
Check IC905, IC902, VR902, VR903, VR904, Q909, Q903, D181, ZD109, D903, C902, C903
Normal
Check "PH" Waveform
Abnormal
Check C220, C221, Q206, Q207, Q208, Q209, VR204, VR205, C223, C224
Normal
Check Q907 Collector Pulse
Abnormal
Check VR901, IC901, IC904, Q912, Q913, Q902, D901, D902, C901, Q905, Q906, Q907, HV+2 Voltage
Normal
Check Q908, D906, L106, D109, C137, L104

Power Supply



8. Detailed Alignment Procedure

- *Before making any adjustments, the monitor should be continually warmed up for 30 minutes.*
- *Before making any adjustments, the monitor should be orientated towards the East.*

1. Regulation of supplied voltage and Hi-voltage

Conditions : input - 110V ac without any video signal;
free run;
brightness control (on the front panel) - maximum;
contrast control (on the front panel) - maximum;

A. Regulation of supplied voltage

1. Adjust VR301, which is on the POWER BD., such that the voltage of 190V at W304 is in the range of 190V±0.5V dc.
2. Adjust VR703, which is on the MAIN BD., such that the test-point's voltage of +5V is in the range of 5V±0.02V dc.

B. Regulation of the horizontal frequency under FREE RUN

1. Dial VR101, which is on the SYNC BD., clock wisely to the maximum and set VR103, which is on the SYNC BD., at the mechanical center position.
2. Adjust VR102, which is on the SYNC BD., such that the horizontal frequency is in the range 24KHz ± 200Hz.

C. Regulation of Hi-voltage

1. Adjust VR105, which is on the MAIN BD., such that the voltage of the Hi-voltage anode is in the range of 29.5kV ± 0.3kV.
2. Adjust VR106, which is on the MAIN BD., such that the operating point's voltage of X-Ray protection is 29.5kV.
3. Adjust VR105 such that the voltage of the Hi-voltage anode is in the range of 27kV ± 0.3kV.

2. *Regulation of the Normal Display*

Conditions : contrast control(on the front panel) - maximum;
brightness control(on the front panel) - maximum;

A. Frequency to Voltage Regulation

1. Input the 640 x 480 mode with Hor-frequency = 31kHz and Ver-frequency = 60Hz.
2. Adjust VR701, which is on the SYNC BD., such that the voltage of T2 is in the range of 2.18 ± 0.02V dc.
3. Adjust VR702, which is on the SYNC BD., such that the voltage of T1 is in the range of 2.35 ± 0.02V dc.

B. Horizontal Hold Regulation

1. Input the 800 x 600 mode with full white pattern where Hor-frequency = 35.15kHz and Ver-frequency = 66Hz.
2. Use a wire connector to connect between ground (GND) and T3 to make it become a short circuit. Then, adjust VR701, which is on the SYNC BD., such that the picture is stable.

3. *Regulation of H-Center, H-Phase, H-Size, V-Position, V-Size and V-Linearity.*

Conditions : input - resolution : 1024 x 768;
pattern : cross hatch pattern;
Hor-frequency : 56.5kHz;
Ver-frequency : 70Hz;
contrast control(on the front panel) - maximum;
brightness control(on the front panel) - maximum;

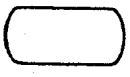
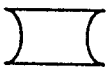
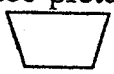
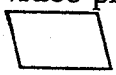
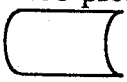
1. Switch downward the SW701 to the PRESET MODE and press once SW710 to restore the STANDARD MODE state.
2. Adjust VR104(H-Center), which is on the MAIN BD., such that the background of the picture is at the center of the front frame.
3. Adjust VR103(H-Phase), which is on the SYNC BD., such that the video picture is at the center of the front frame. Moreover, the phase difference between the left and right side of the display should less or equal to ± 4mm.(i.e.≤ ± 4mm)
4. Adjust VR901(H-Size), which is on the MAIN BD., such that the horizontal size of the display within the specification 300 ± 4mm.

5. Adjust VR201(V-Linearity), which is on the MAIN BD., such that the upper, middle and lower checks on the picture are with identical size.
6. Adjust VR203(V-Size), which is on the MAIN BD., such that the vertical size of the display within the specification 220 ± 2mm.
7. Adjust VR202(V-Pos), which is on the MAIN BD., such that the video picture is at the center of the front frame. Moreover, the difference between the up and down of the display should less or equal to ± 2mm.(i.e.,≤ ±2mm)

4. *Regulation of Geometric Distortion*

Conditions : input - resolution : 1024 x 768;
pattern : cross hatch pattern;
Ho-frequency : 56.5kHz;
Ver-frequency : 70Hz;

A. Fine Adjustment of the Geometric Distortion

1. Adjust VR904(PIN), which is on the MAIN BD., such that the pincushion and barrel between each side are under the specification.
   PIN ≤ 1.5mm
   BARREL ≤ 1.0mm
   Such adjustment can avoid the video picture from occurring distortions like
    and 
2. Adjust VR902(Trapezoid), which is on the MAIN BD., to avoid the video picture from occurring distortions like
    or
3. Adjust VR205(Parallelogram), which is on the MAIN BD., to avoid the video picture from occurring distortions like
    or
4. Adjust VR204(with one side suffering from pincushion , the other suffering from barrel), to keep the video picture in balance. The location of VR204 is on the MAIN BD.. Furthermore, such adjustment can avoid the video picture from occurring distortions like
    or
5. Adjust VR903(Offset), which is on the MAIN BD., to avoid the upper part of the video picture from distortion like

B. Reconfirmation of H-Phase Regulation

Adjust VR103 again to make the video picture at the center of the front frame. At that time, the specification of the difference between both sides becomes $\leq \pm 2$mm.

C. Reconfirmation of H-Size Regulation

Adjust VR901 again to make the horizontal size within the range of 300 ± 2mm.

5. Regulation of White Balance and Brightness

Conditions : input - resolution : 1024 x 768;
pattern : central block pattern
Hor-frequency : 56.5kHz;
Ver-frequency : 70Hz;

A. Regulation of White Balance

(a) For the raster

1. Tune VR404, VR405 and VR406 clock-wisely to the bottom. The locations of these VRs are on the VIDEO BD..
2. Adjust the contrast control(VR408) to the minimum while the brightness control(VR503) to the maximum. Both the contrast control and the brightness control are on the front panel.
3. Adjust the SCREEN VR, which is on the FBT, such that the background is about 0.7FL. (i.e. the value of Y on the TV- color analyzer)
4. Adjust VR404, VR405 and VR406(by Addition) such that $x = 0.281 \pm 0.005$ and $y = 0.311 \pm 0.005$. The locations of these VRs are on the VIDEO BD..
5. Adjust the SCREEN VR again to make the background is about $0.7FL \pm 0.5FL$.
6. Check the values of x and y again to confirm the regulation where $x = 0.281 \pm 0.005$ and $y = 0.311 \pm 0.005$.

(b) For the gain

1. Tune VR401, VR402 and VR403 clock-wisely to the bottom. The locations of these VRs are on the VIDEO BD..
2. Adjust the contrast control(VR408) such that $Y = 7FL \pm 0.5FL$. Tune the brightness control(VR503) to the minimum.
3. Adjust VR401, VR402 and VR404(by Subtraction) such that $x = 0.281 \pm 0.005$ and $y = 0.311 \pm 0.005$. The locations of these VRs are on the VIDEO BD..
4. Then, tune the contrast control(VR408) and the brightness control(VR503) to the maximum.

5. Adjust VR407, which is on the VIDEO BD., the brightness of the center within the specification 45FL ± 2FL.

6. *Focus, CG Regulation*

A. Focus Regulation

Conditons : input - resolution : 1024 x 768;
pattern : cross hatch pattern;
letter "H" pattern;
Hor-frequency : 56.5kHz;
Ver-frequency : 70Hz;

1. Adjust the FOCUS VR(1), which is on the FBT, such that the horizontal lines of the patterns become clear.
2. Adjust the FOCUS VR(2), which is on the FBT, such that the vertical lines of the patterns become clear.

B. CG Regulation

Conditions : input - resolution : 1024 x 768;
pattern : cross hatch pattern;
Hor-frequency : 56.5kHz;
Ver-frequency : 70Hz;

(a) Statistic Convergence Regulation

1. At first, input the purple cross hatch pattern. Adjust the "four pole", which is on the CRT magnetic ring, such that the purple convergence is in compliance with the specification.
2. Then, input the white cross hatch pattern. Adjust the " six pole", which is on the CRT magnetic ring, such that the convergence is in compliance with the specification.

(b) Dynamic Convergence Regulation

Use magnetic pieces to improve the picture and make the convergence within the specification.

✞Note: During using a CG mirror to check the convergence, make sure that X, Y are kept upwards.

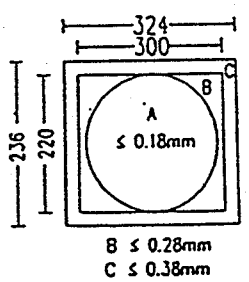


Figure 8.1

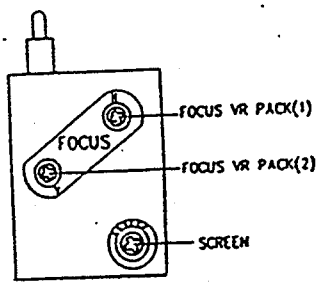


Figure 8.2

9. Measured Waveforms

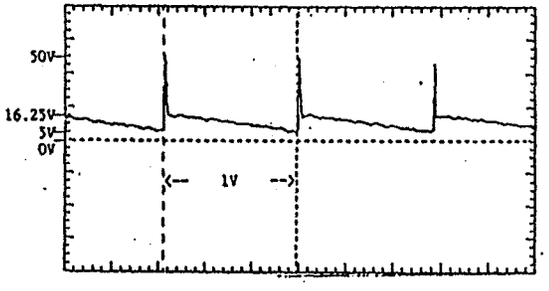
Test Conditions

1H = Horizontal Frequency
= 56.476 kHz;

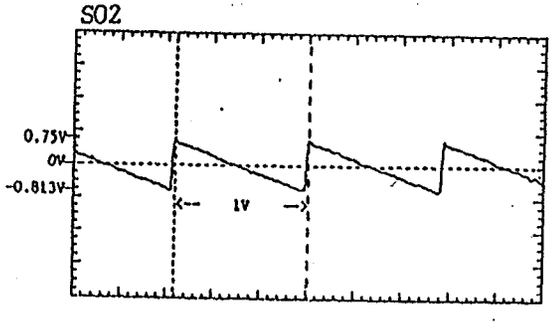
1V = Vertical Frequency
= 70.069 Hz;

S36 ~ S45
pattern : full white pattern

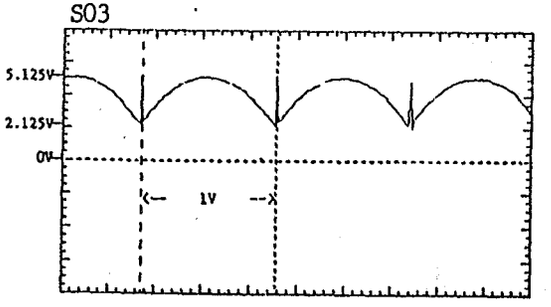
S01



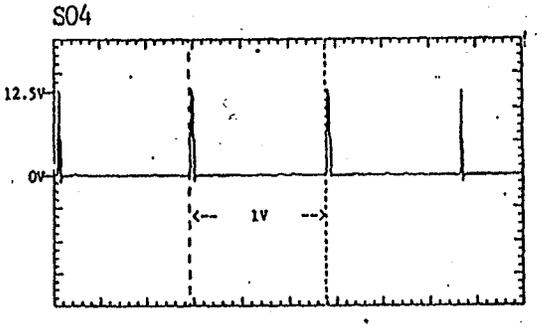
S02



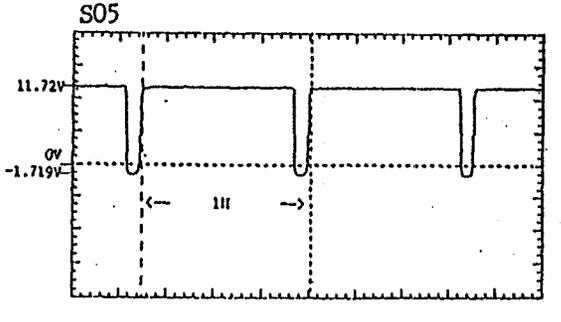
S03



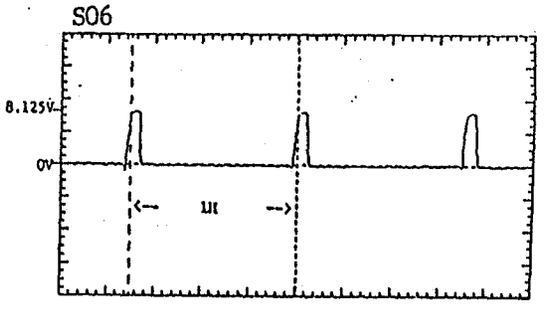
S04



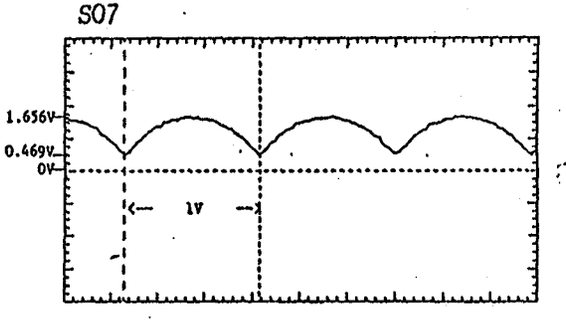
S05



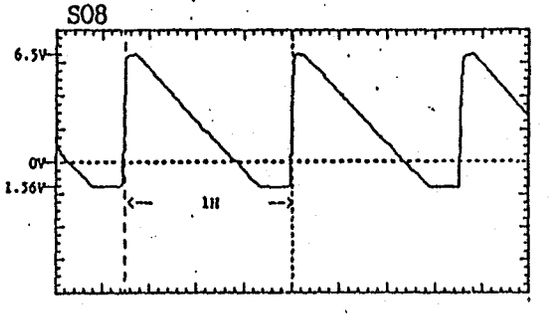
S06



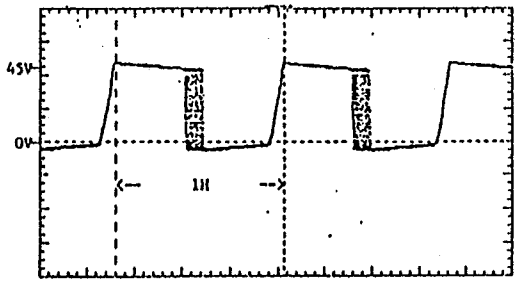
S07



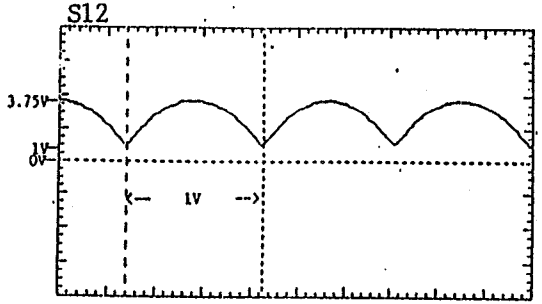
S08



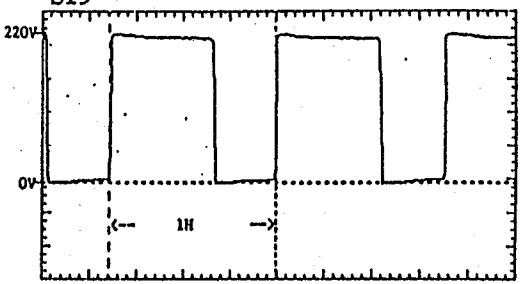
S09



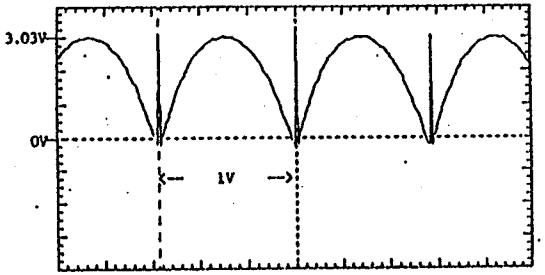
S12



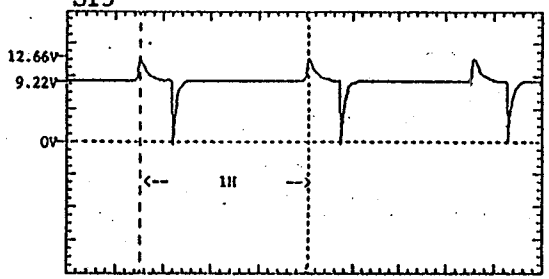
S15



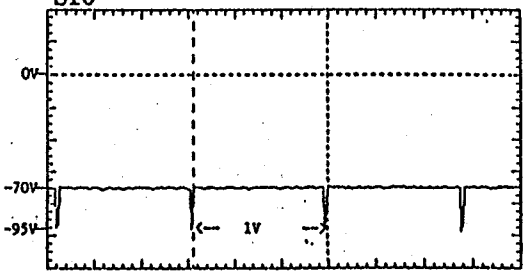
S10



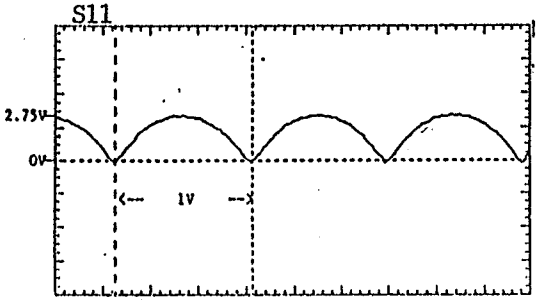
S13



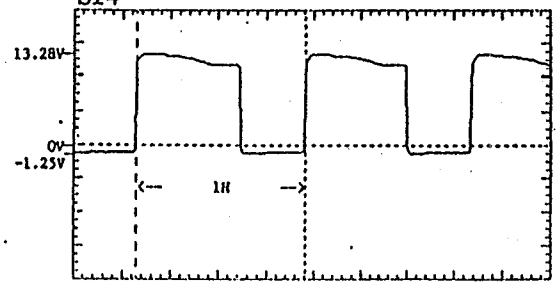
S16



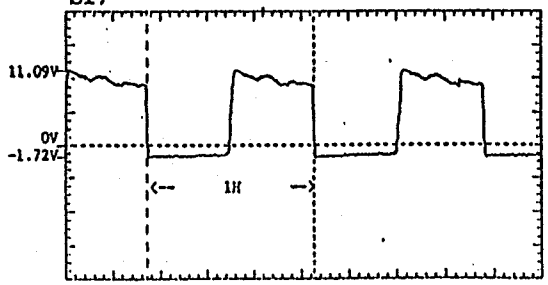
S11



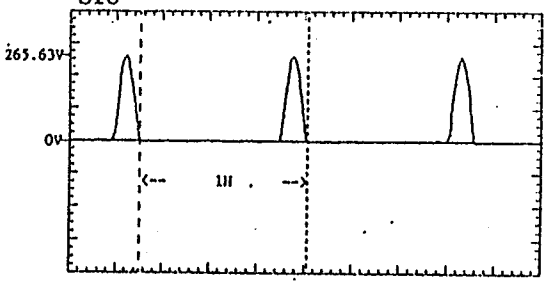
S14



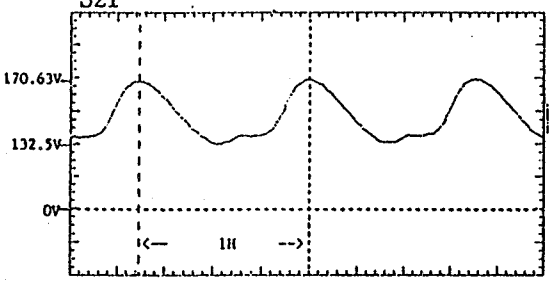
S17



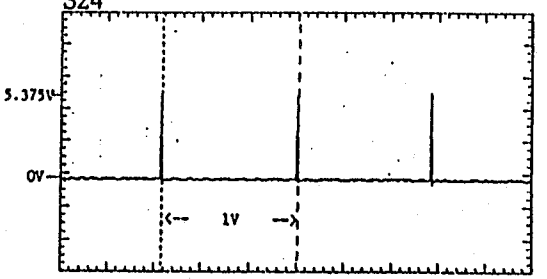
S18



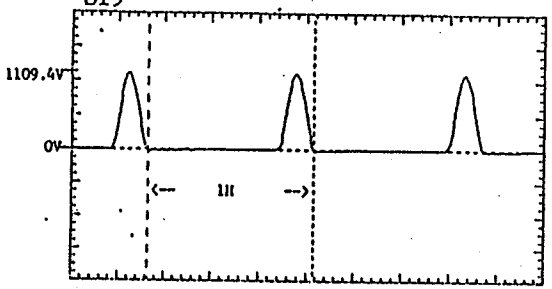
S21



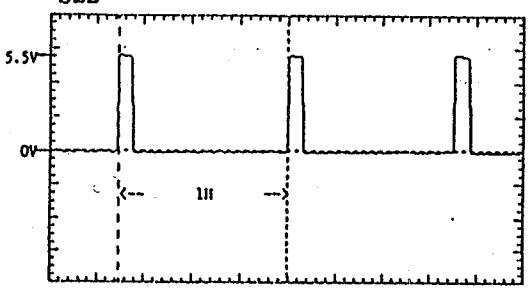
S24



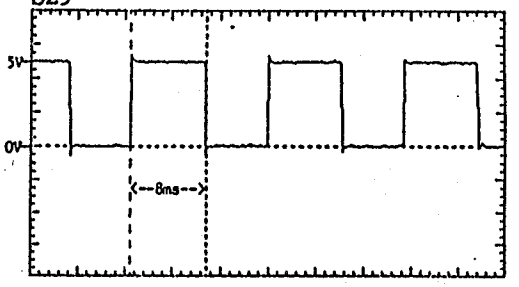
S19



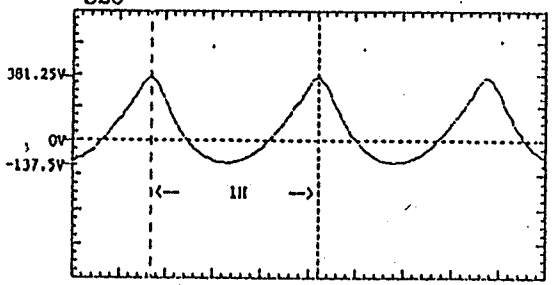
S22



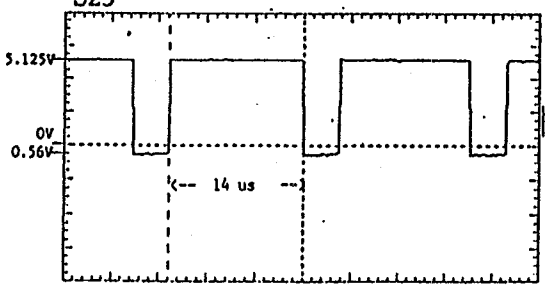
S25



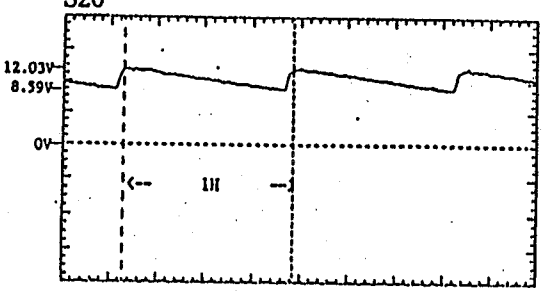
S20



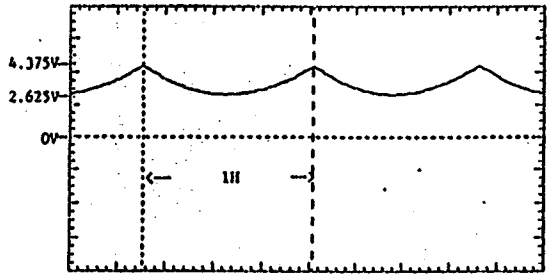
S23



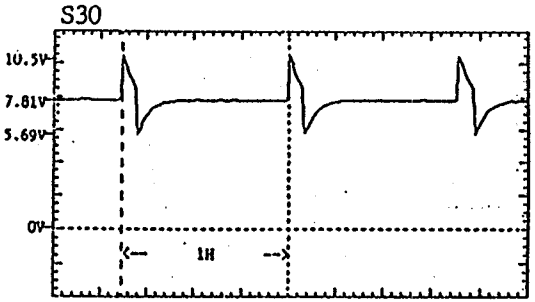
S26



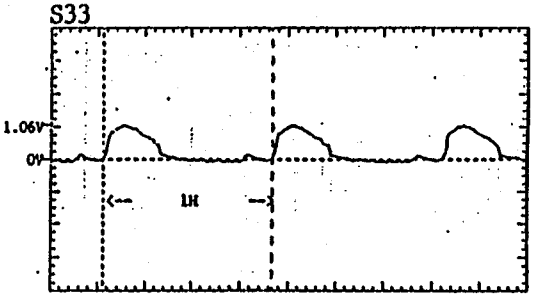
S27



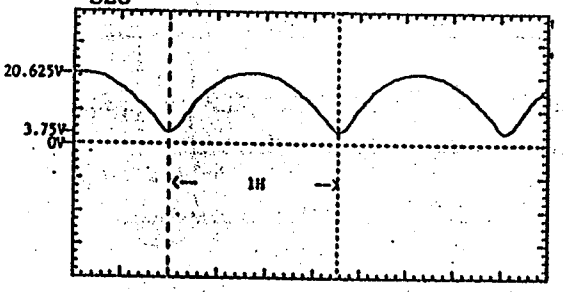
S30



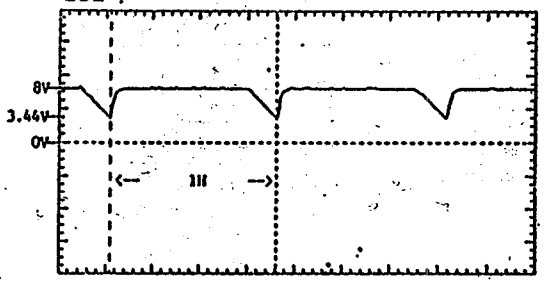
S33



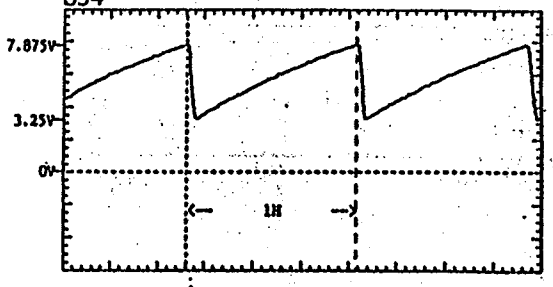
S28



S31

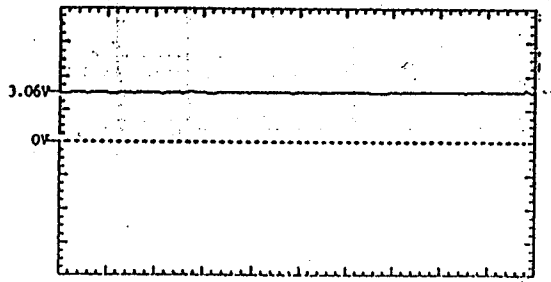


S34

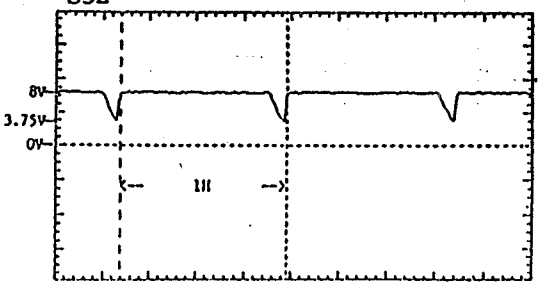


43

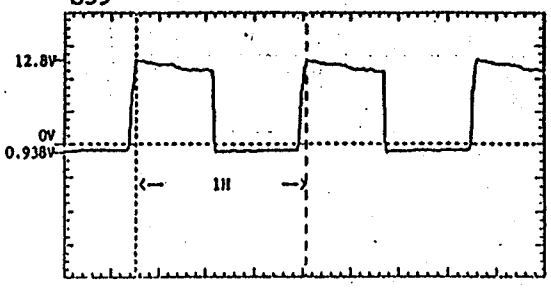
S29



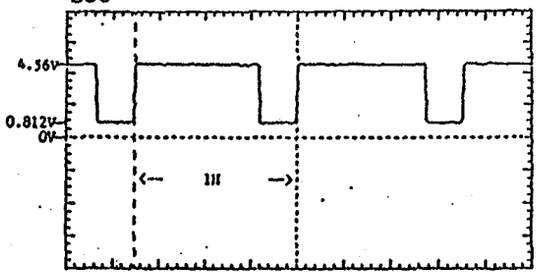
S32



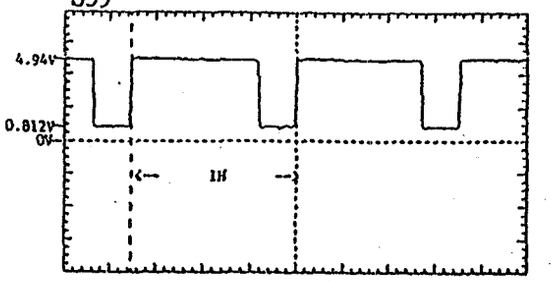
S35



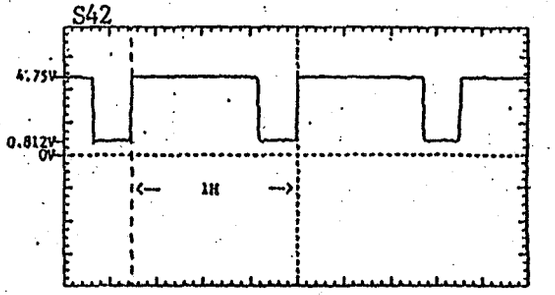
S36



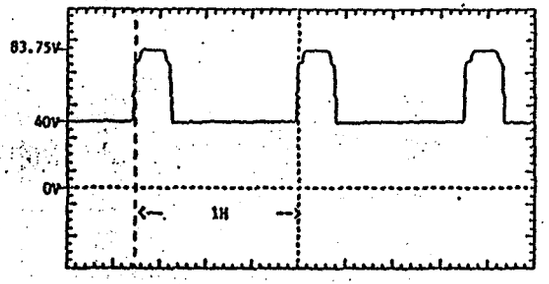
S39



S42

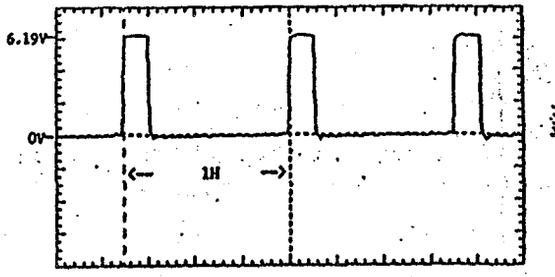


S37

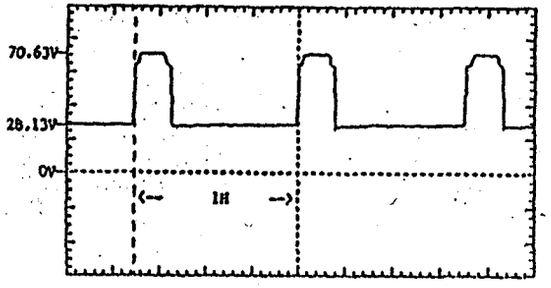


S40

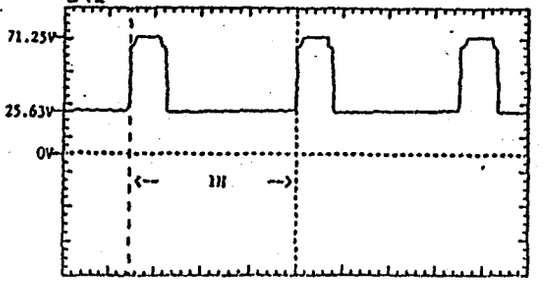
S43



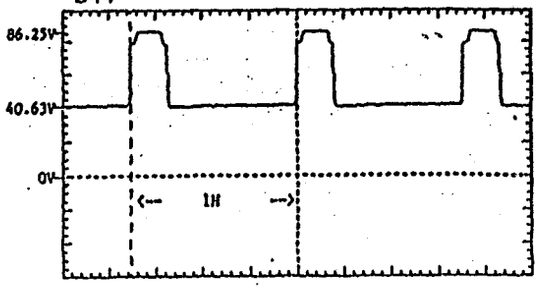
S38



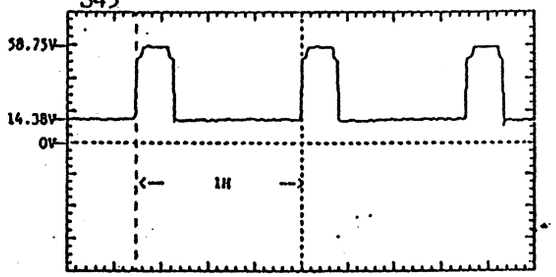
S41



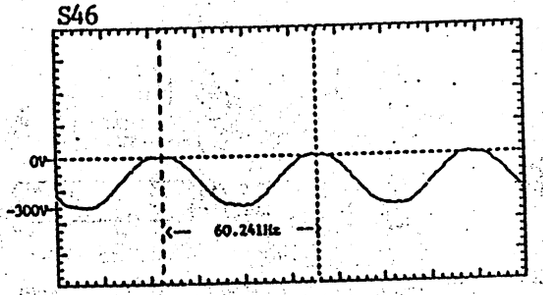
S44



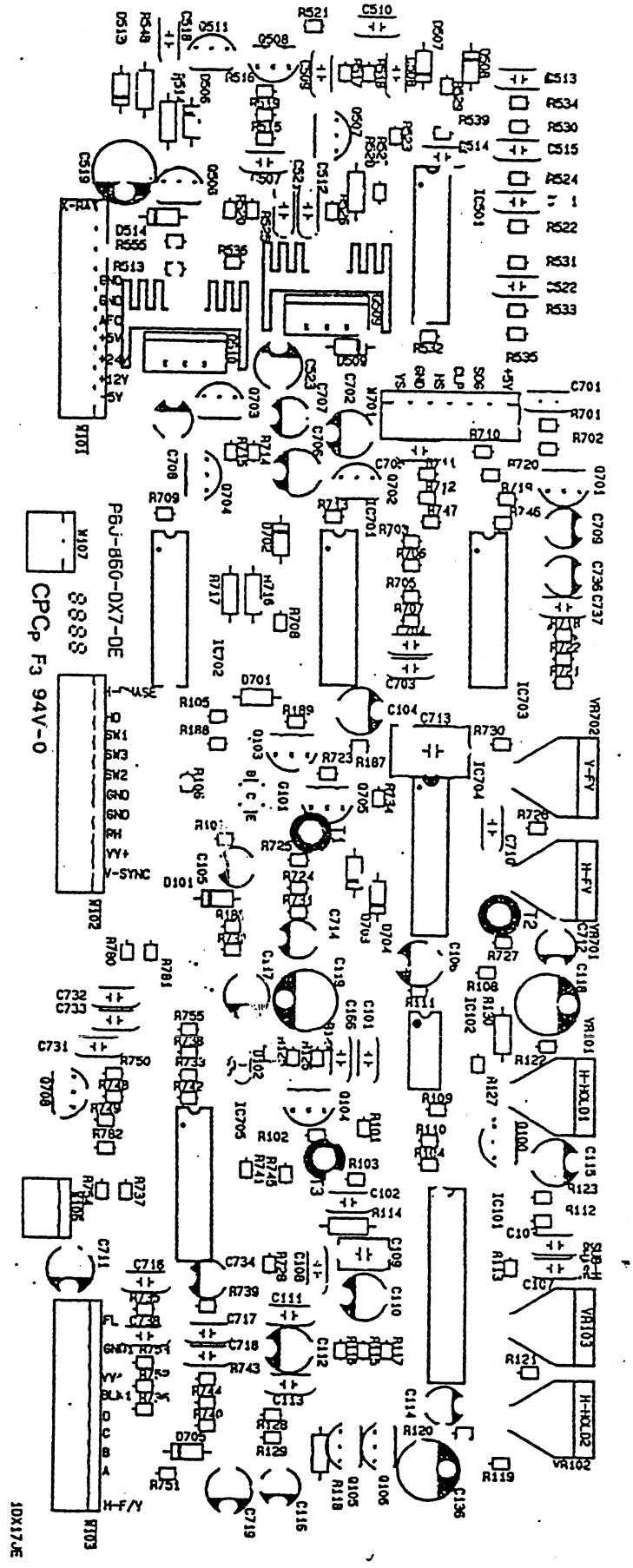
S45



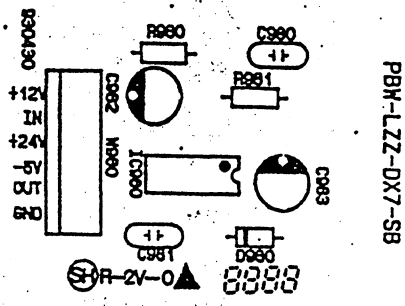
S46



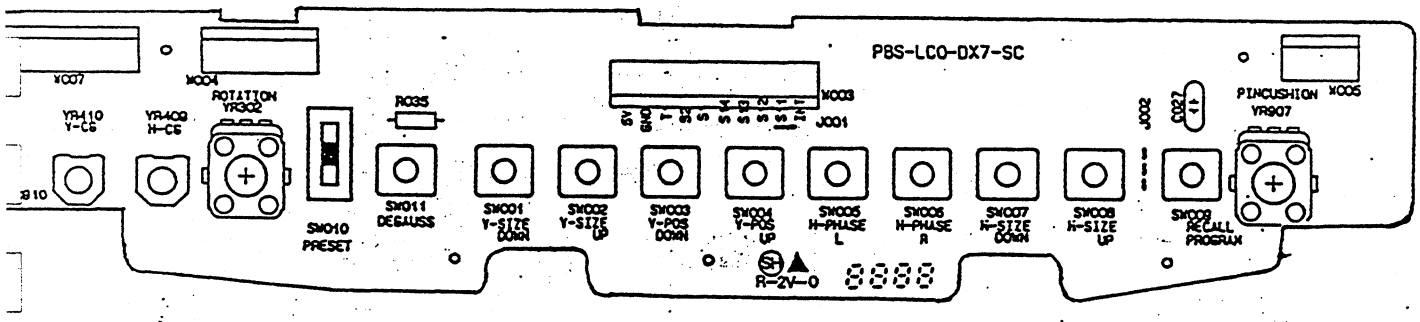
45



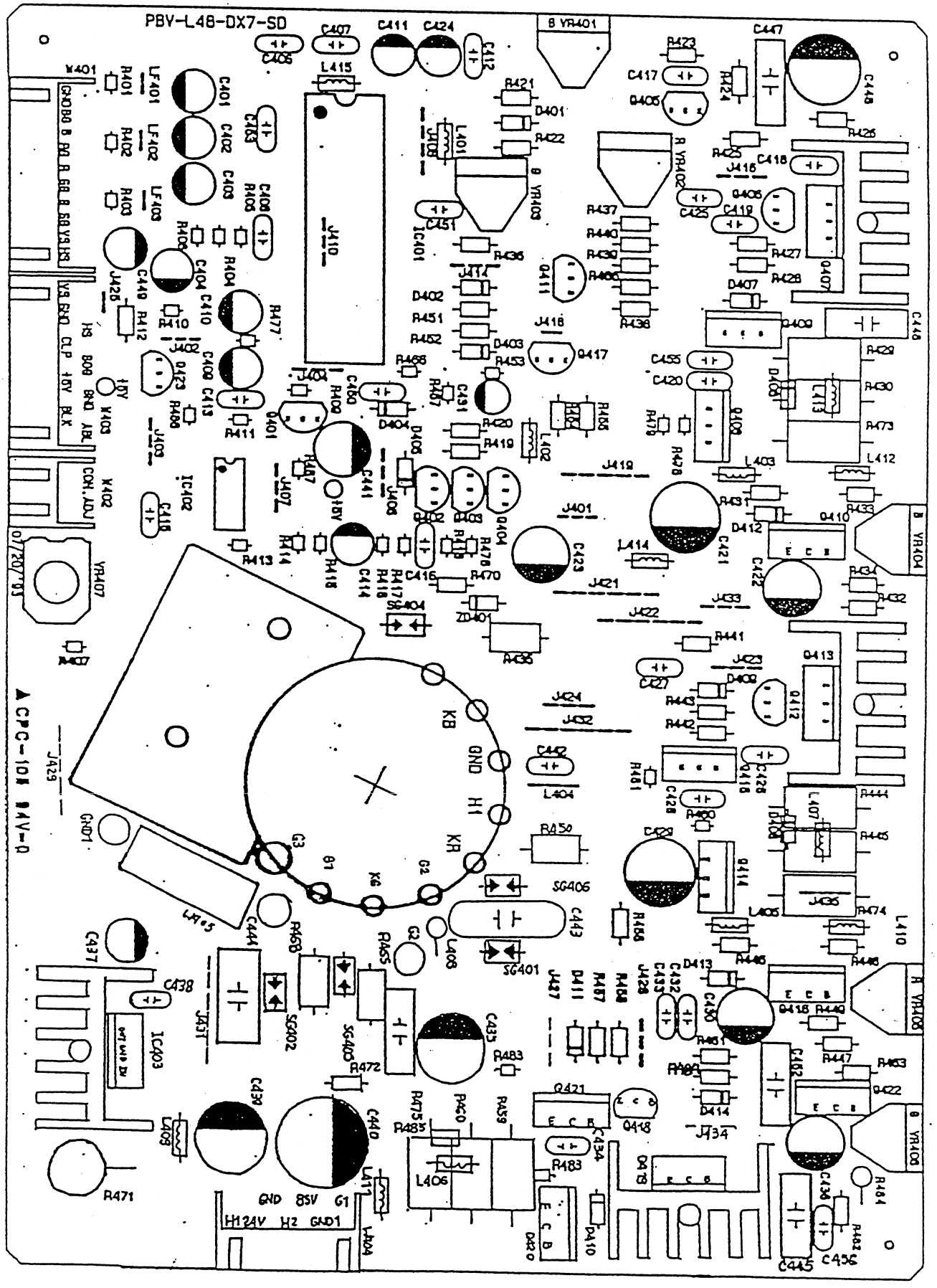
SYNC Board



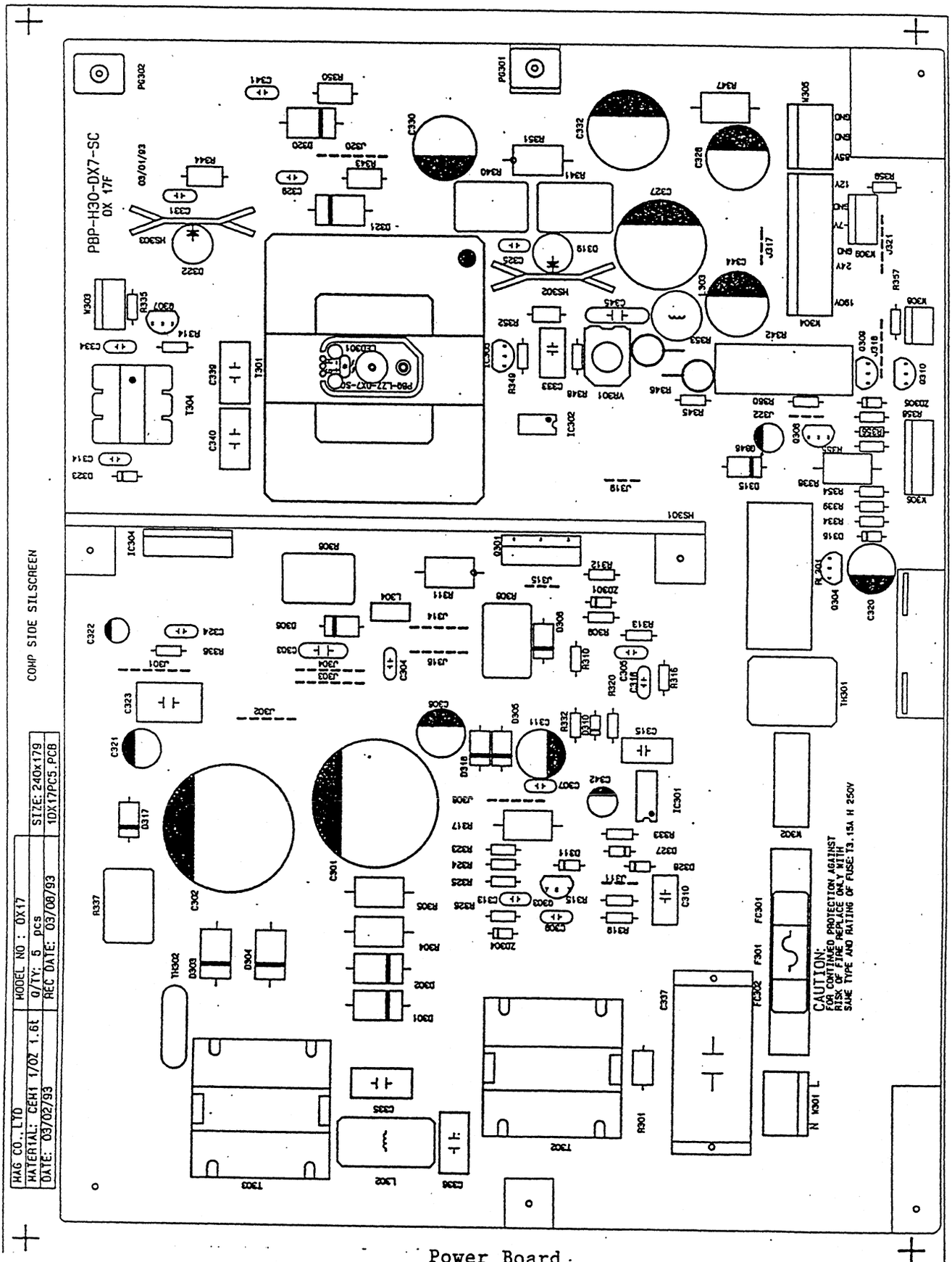
Sample Board



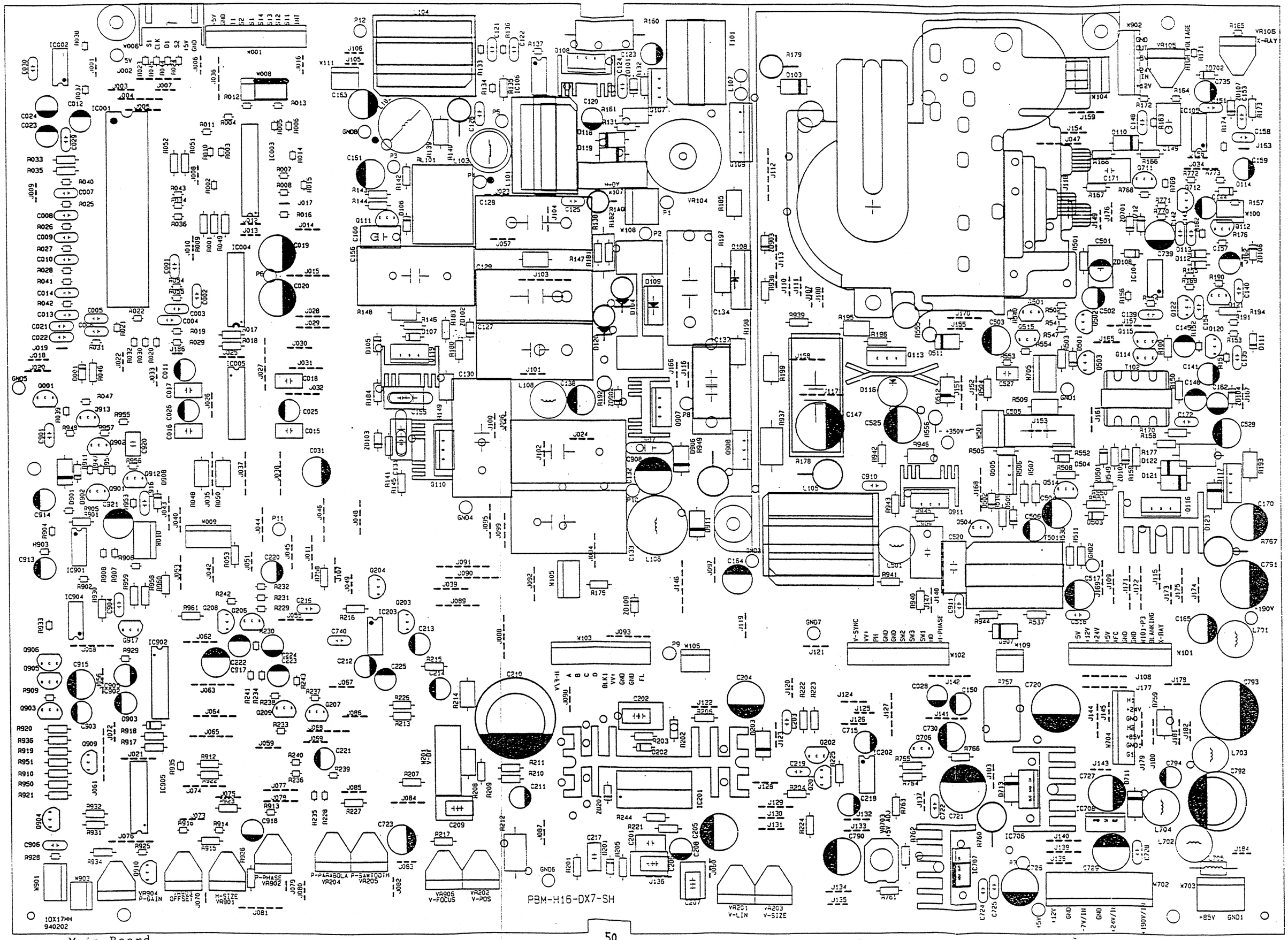
Display Board



Video Board


PBP-H30-DX7-SC
DX 17F
09/01/93
COMP SIDE SILSCREEN
CAUTION:
FOR CONTINUED PROTECTION AGAINST
RISK OF FIRE REPLACE ONLY WITH
SAME TYPE AND RATING OF FUSE T3.15A H 250V
HAG CO.,LTD
MATERIAL: CEM1 1/02 1.6t
DATE: 03/02/93
MODEL NO : DX17
Q'TY: 5 pcs
REC DATE: 03/08/93
SIZE: 240x179
10X17PC5.PCB

Power Board


P8M-H16-DX7-SH
10X17MH
940202
P-PHASE
VR902
P-PARABOLA
VR204
P-SAWTOOTH
VR205
VR904
P-GAIN
H-SIZE
VR901
VR905
V-FOCUS
VR202
V-POS
VR201
V-LIN
VR203
V-SIZE
VR105
X-RAY
+190V
+85V
GND1

Main Board

11. ELECTRICAL PARTS LIST

11.1 BOARD NAME : A17DXF30150 MAIN BD ASS'Y

NO.	*PART NO.*	*SPEC/DESCRIPTION*	*LOCATION*
1	CPI33450VHJ	CAP.PEI 0.33μf 50VJ	C202
2	CEA1C0451L1	CAP.ELECT 1μf 450V	C525
3	CEA33C251L1	CAP.ELECT 33μf 250V	C791
4	CEA22135VL1	CAP.ELECT 220μf 35V	C204,C205,C504
5	CEA10235VL1	CAP.ELECT 1000μf 35V	C793
6	D*FBYT52D*E	DIODE RECOVERY : BYT52D	D110,D118,D119 D120,D121,D122, D123,D203,D713 D901,D911
7	D*F30DF6**A	DIODE RECOVERY : 30DF6	D116
8	D*FBYT8613E	DIODE RECOVERY : BYT86-1300	D108
9	D*FBYT8660E	DIODE RECOVERY : BYT86-600	D109
10	D*FBYT53J*E	DIODE RECOVERY : BYT53J	D511,D512
11	D*ZHZ12A2*H	DIODE ZENER: 11.9V-12.4V 1/2W	ZD101,ZD102, ZD103,ZD104, ZD105,ZD109, ZD902,ZD903
12	ICCD4051BER	IC CD4051BE DIP-16 PIN	IC004
13	ICL7812CV*J	IC L7812CV TO-220 3 PIN	IC706
14	ICNE555P**X	IC NE555P DIP-8 PIN	IC104
15	ICTDA1675AJ	IC TDA1675A MULTIWATT 15 PIN	IC201
16	ICTDA8146*J	IC TDA8146	IC905
17	Q*2SA1306BG	TRANSISTOR 2SA1306B	Q908
18	Q*2SA673**H	TRANSISTOR 2SA673 (TO-92)	Q112,Q204,Q706
19	Q*2SC1213CH	TRANSISTOR 2SC1213C (TO-92)	Q203,Q906,Q909
20	Q*2SC1921*H	TRANSISTOR 2SC1921(TO-92 MOD)	Q504
21	Q*2SC2899*H	TRANSISTOR 2SC2899 (TO-126)	Q911
22	Q*2SC4747*H	TRANSISTOR 2SC4747 (TO-3P)	Q109
23	Q*2SD1133*H	TRANSISTOR 2SD1133 (TO-220AB)	Q108
24	Q*2SD799**G	TRANSISTOR 2SD799 (TO-220AB)	Q117
25	Q*2SK1378*G	TRANSISTOR 2SK1378 (TO-220AB)	Q110,Q116,Q119
26	Q*2SK891**G	TRANSISTOR 2SK891 (TO-220AB)	Q107
27	TF26V0011L0	X'FMR F.B.T. 26KV	T103
28	T*I220602F0	H.D.T X'FMR EI-22*06	T101
29	T*I281103F0	CHOKE COIL EEL-28*11 4.5mH	L105

11.2 BOARD NAME : A17DXF30151 VIDEO BD ASS'Y

NO.	PART NO.	SPEC/DESCRIPTION	LOCATION
1	CEA22135VL1	CAP.ELECT 220μF 35V	C439
2	ICLM1203BND	IC LM1203BN DIP-28 PIN	IC401
3	ICLM393N**D	IC LM393N DIP-8PIN	IC402
4	Q*2SA1810CH	TRANSISTOR 2SA1810 TO-126	Q409,Q415,Q421
5	Q*2SC1213CH	TRANSISTOR 2SC1213C (TO-92)	Q404,Q405,Q406, Q411,Q412,Q417, Q418
6	Q*2SC4704CH	TRANSISTOR 2SC4704C TO-126	Q408,Q414,Q420
7	Q*2SC4934EH	TRANSISTOR 2SC4934E TO 126FM	Q407,Q413,Q419

11.3 BOARD NAME : A17DXF30265 SYNC BD ASS'Y

NO.	PART NO.	SPEC/DESCRIPTION	LOCATION
1	D*G1N4148*L	DIODE GENERAL PURPOSE : 1N4148	D101,D506,D507, D508,D509,D513, D701,D702,D705
2	ICDM74LS38D	IC DM74LS38 DIP-14 PIN	IC703
3	ICLA7850**S	IC LA7850 DIP-20 PIN	IC101
4	ICM74HC86ND	IC MM74HC86N DIP-14 PIN	IC701,IC702
5	IC4HC4538PP	IC PC74HC4538P DIP-14 PIN	IC704
6	ICLM339N**D	IC LM339N DIP-14 PIN	IC705
7	Q*2SA673**H	TRANSISTOR 2SA673 (TO-92)	Q104,Q105
6	Q*H945P***H	TRANSISTOR H945P (TO-92)	Q100,Q103,Q105, Q506,Q507,Q508, Q701,Q702,Q703, Q704,Q708

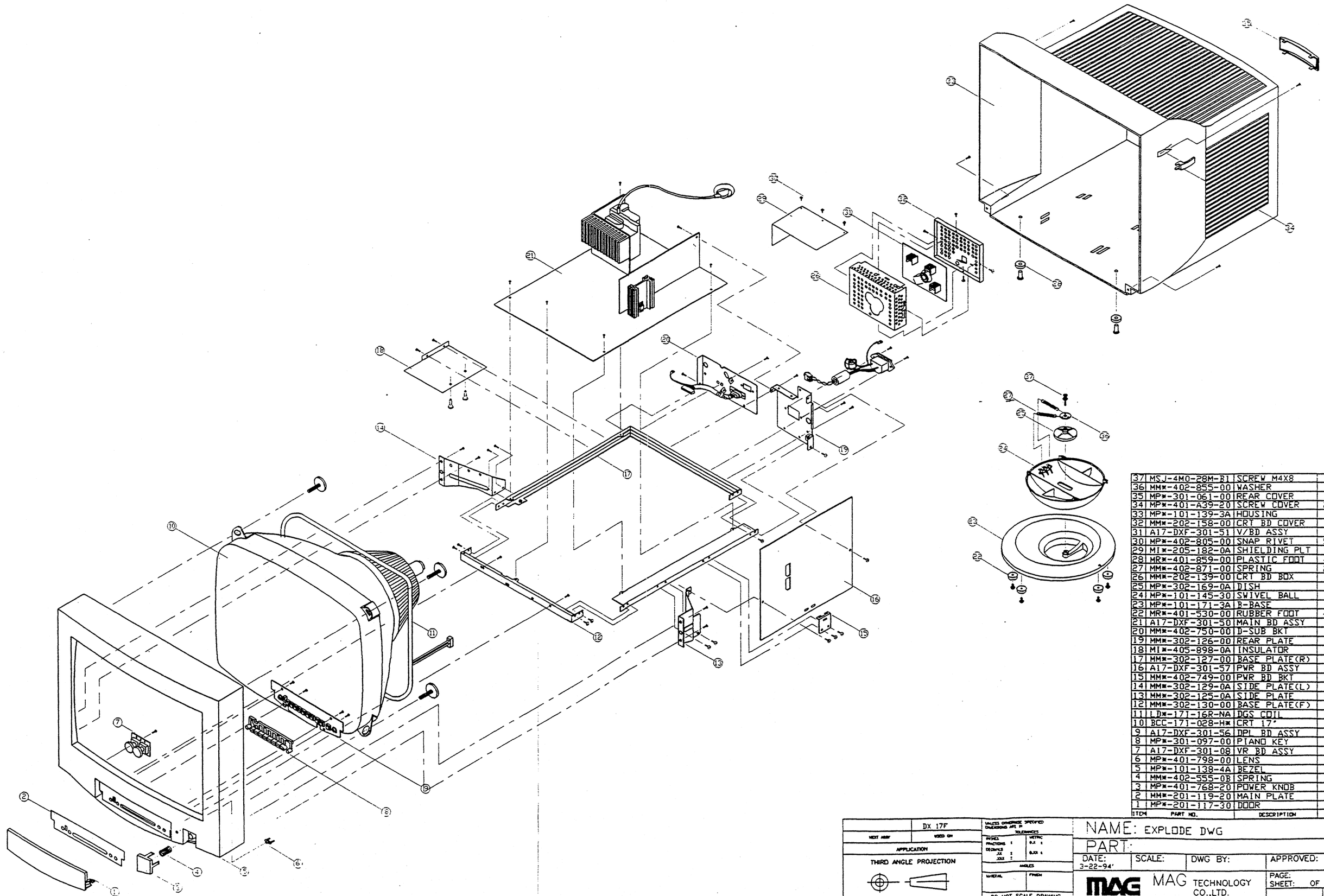
11.4 BOARD NAME : A17DXF30304 CRT ASS'Y

NO.	PART NO.	SPEC/DESCRIPTION	LOCATION
1	BCC17I028H*	CRT 17" COLOR	CRT

11.5 BOARD NAME : A17DXF30157 POWER BD ASS'Y

NO.	PART NO.	SPEC/DESCRIPTION	LOCATION
1	CEA2C2451L1	CAP.ELECT 2.2μf 450V	C321
2	CEA33C251L1	CAP.ELECT 33μf 250V	C344
3	CEA101251L1	CAP.ELECT 100μf 250V	C327
4	CEA22135VL1	CAP.ELECT 220μf 35V	C320
5	CEA10216VL1	CAP.ELECT 1000μf 16V	C330
6	CEA10235VL1	CAP.ELECT 1000μf 35V	C332
7	D*F10DF2**A	DIODE RECOVERY : 10DF2	D318
8	D*FBA159**B	DIODE RECOVERY : BA159/1A 1KV	D062,D306,D308
9	D*FBYM36A*Q	DIODE RECOVERY : BYM36A	D063,D322
10	D*FBYM36C*Q	FAST RECOVERY DIODE BYM36C	D320
11	D*FBYM36E*Q	FAST RECOVERY DIODE BYM36E	D319
12	D*G1N4002*W	DIODE GENERAL PURPOSE : 1N4002	D315,D064,D065
13	D*G1N4007*B	DIODE GENERAL PURPOSE : 1N4007	D317,D324,D325
14	FH****003D*	FUSE CLIPER (5*20mm)	FC301,FC302
15	IC4N35T***M	IC 4N35T DIP-6 PIN	IC062,IC302
16	ICC74HC14PP	IC PC74HC14P DIP-14 pin	IC061
17	ICCS3842A*Y	IC CS3842A DIP-8 PIN	IC301
18	ICLM317T**M	IC LM317T TO-220 3 PIN	IC060
19	ICTL431CLPM	IC TL431CLP TO-92 3 PIN	IC305
20	ICTR80145AE	IC STR80145A 5 PIN	IC304
21	Q*2SA673**H	TRANSISTOR 2SA673 (TO-92)	Q310
22	Q*2SB857**H	TRANSISTOR 2SB857 (TO-220AB)	Q063
23	Q*2SC1213CH	TRANSISTOR 2SC1213C (TO-92)	Q061,Q064,Q065, Q066,Q067,Q068, Q069,Q304,Q307, Q308,Q309
24	Q*2SC2979*H	TRANSISTOR 2SC2979 (TO-220AB)	Q062
25	Q*2SK1794*N	TRANSISTOR 2SK1794	Q301
26	RL212V5A0M1	RELAY AC 2S 250Vac 5A/12Vdc	RL301
27	RMB680C21J8	RES. FUSIBLE 0.68 Ohm 2W J	R351
28	RMV220C21J8	RES. WIRE WOUND 0.22 Ohm 2W J	R311
39	T*E190524E0	POWER X'FMR EEL-19*05 23mH	T060
30	VAP14R253W4	PROSISTOR 14 Ohm 25 A 2P	TH301
31	VAN5R0402T2	THERMISTOR 5 Ohm 4A	TH302
32	VRD101B03J*	VR. (B) 100 Ohm LAYER DOUBLE	VR301
33	VRD201B03J*	VR. (B) 200 Ohm LAYER DOUBLE	VR060

REVISIONS				
ECN	REV	DESCRIPTION	DATE	APPROVED



ITEM	PART NO.	DESCRIPTION	QTY
37	MSJ-4M0-28M-B1	SCREW M4X8	1
36	MM*-402-855-00	WASHER	1
35	MP*-301-061-00	REAR COVER	1
34	MP*-401-A39-20	SCREW COVER	2
33	MP*-101-139-3A	HOUSING	1
32	MM*-202-158-00	CRT BD COVER	1
31	A17-DXF-301-51	V/BD ASSY	1
30	MP*-402-805-00	SNAP RIVET	5
29	MI*-205-182-0A	SHIELDING PLT	1
28	MR*-401-859-00	PLASTIC FOOT	4
27	MM*-402-871-00	SPRING	2
26	MM*-202-139-00	CRT BD BOX	1
25	MP*-302-169-0A	DISH	1
24	MP*-101-145-30	SWIVEL BALL	1
23	MP*-101-171-3A	B-BASE	1
22	MR*-401-530-00	RUBBER FOOT	4
21	A17-DXF-301-50	MAIN BD ASSY	1
20	MM*-402-750-00	D-SUB BKT	1
19	MM*-302-126-00	REAR PLATE	1
18	MI*-405-898-0A	INSULATOR	1
17	MM*-302-127-00	BASE PLATE(R)	1
16	A17-DXF-301-57	PWR BD ASSY	1
15	MM*-402-749-00	PWR BD BKT	1
14	MM*-302-129-0A	SIDE PLATE(L)	1
13	MM*-302-125-0A	SIDE PLATE	1
12	MM*-302-130-00	BASE PLATE(F)	1
11	LD*-171-16R-NA	DGS COIL	1
10	BCC-171-028-H*	CRT 17"	1
9	A17-DXF-301-56	DPI BD ASSY	1
8	MP*-301-097-00	PIANO KEY	1
7	A17-DXF-301-08	VR BD ASSY	1
6	MP*-401-798-00	LENS	1
5	MP*-101-138-4A	BEZEL	1
4	MM*-402-555-0B	SPRING	1
3	MP*-401-768-20	POWER KNOB	1
2	MM*-201-119-20	MAIN PLATE	1
1	MP*-201-117-30	DOOR	1

NEXT ASSY	DX 17F
USED ON	
APPLICATION	
THIRD ANGLE PROJECTION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN TOLERANCES

	METRIC
FRACT.	
FUNCTIONS	± 0.4
DECIMALS	
.XX	± 0.25
.XXX	±
ANGLES	
MATERIAL	FINISH

DO NOT SCALE DRAWING

NAME: EXPLODE DWG

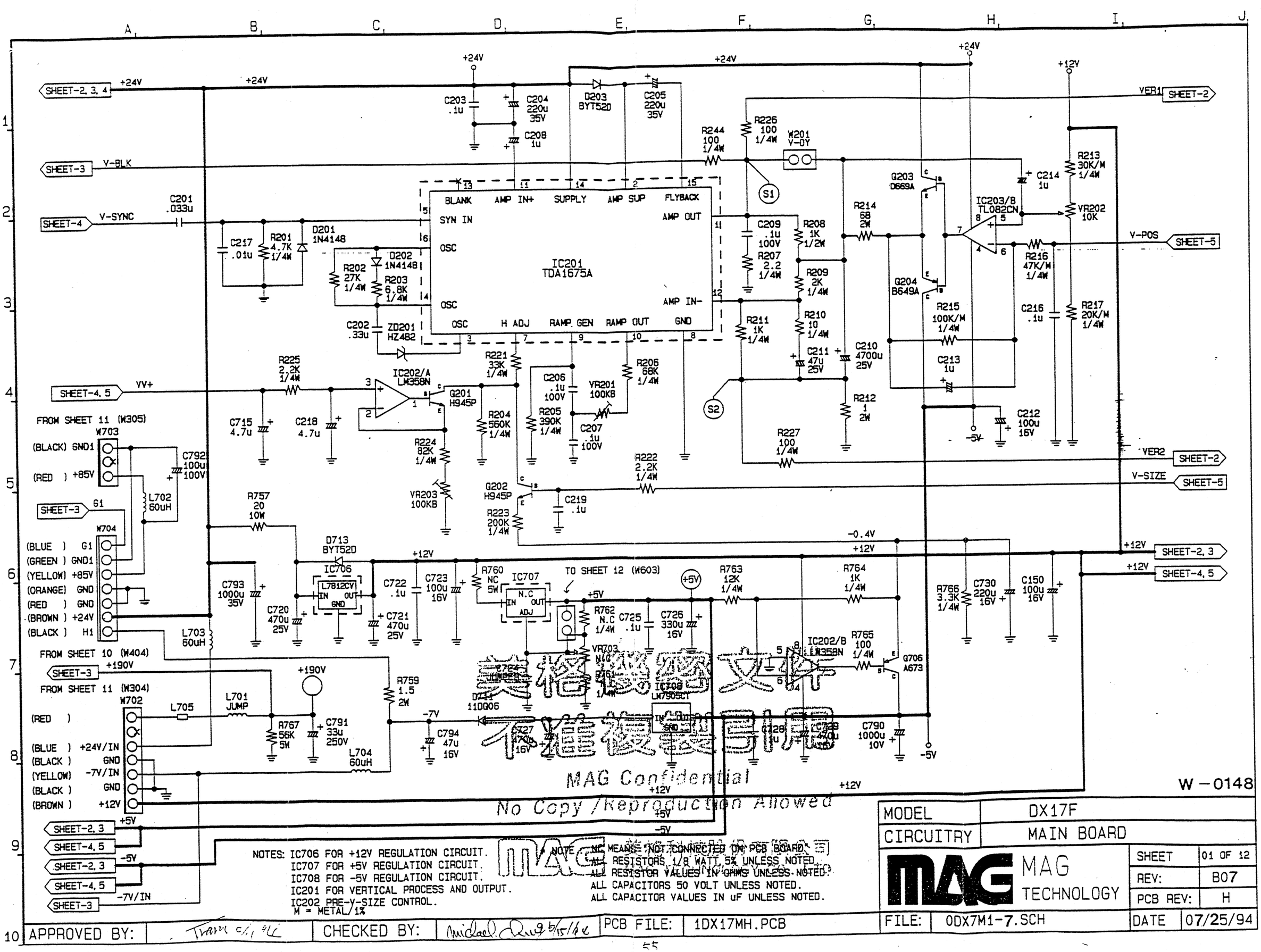
PART:

DATE:	SCALE:	DWG BY:	APPROVED:
3-22-94'			

MAG TECHNOLOGY CO.,LTD.

PAGE: SHEET: OF

A1



NOTES: IC706 FOR +12V REGULATION CIRCUIT.
IC707 FOR +5V REGULATION CIRCUIT.
IC708 FOR -5V REGULATION CIRCUIT.
IC201 FOR VERTICAL PROCESS AND OUTPUT.
IC202 PRE-V-SIZE CONTROL.
M = METAL/1%

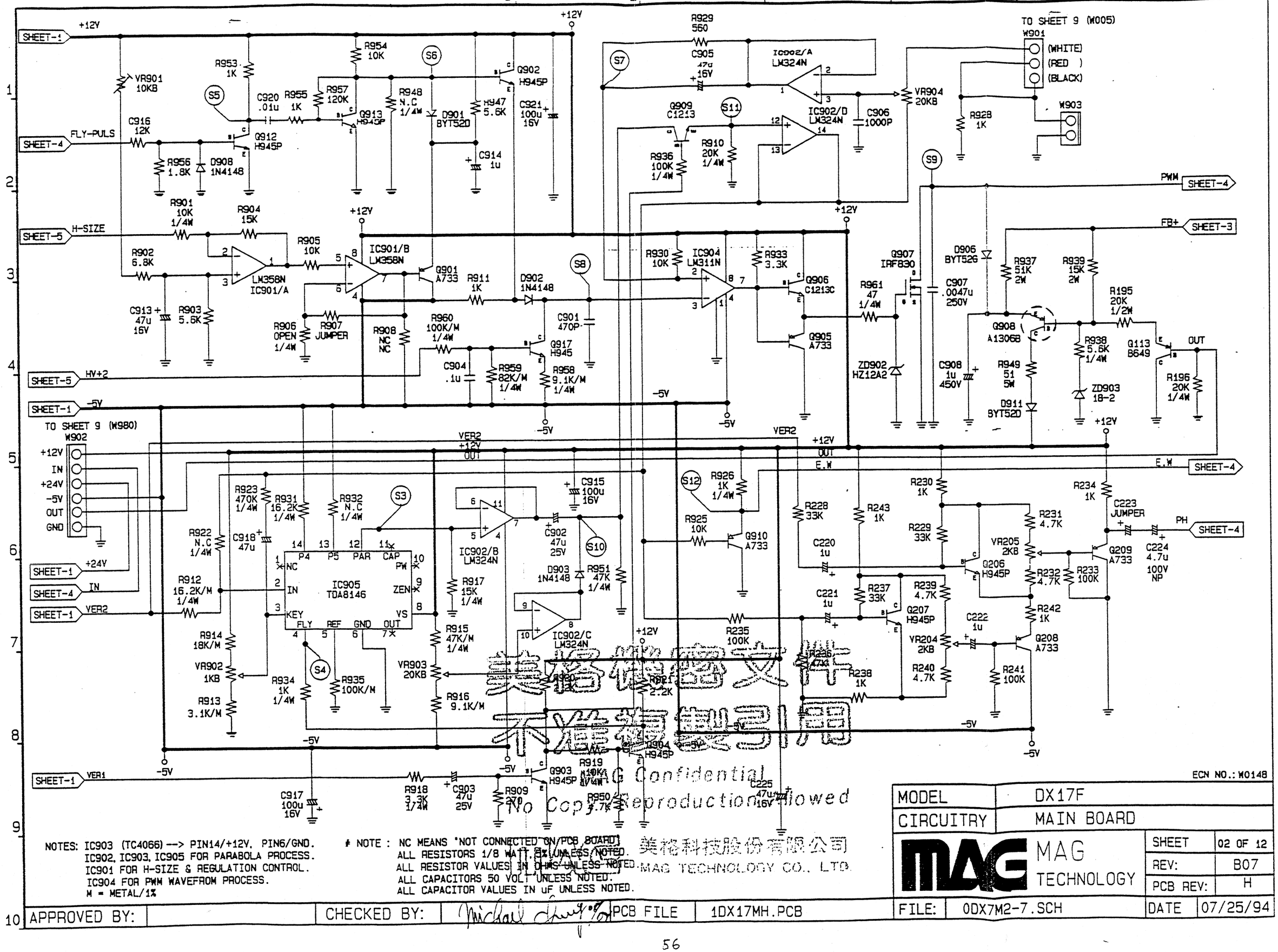
NOTE: NC MEANS "NOT CONNECTED ON PCB BOARD."
ALL RESISTORS 1/8 WATT 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.

MAG Confidential
No Copy / Reproduction Allowed

W-0148

MODEL	DX17F		
CIRCUITRY	MAIN BOARD		
MAG TECHNOLOGY		SHEET	01 OF 12
		REV:	B07
		PCB REV:	H
FILE:	0DX7M1-7.SCH	DATE	07/25/94

APPROVED BY:	Thanh C/1 7/C	CHECKED BY:	Michael Ruy 5/15/94	PCB FILE: 1DX17MH.PCB



MAG Confidential
No Copy Reproduction Allowed

NOTES: IC903 (TC4066) --> PIN14/+12V, PIN6/GND.
IC902, IC903, IC905 FOR PARABOLA PROCESS.
IC901 FOR H-SIZE & REGULATION CONTROL.
IC904 FOR PWM WAVEFROM PROCESS.
M = METAL/1%

NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.

美格科技股份有限公司
MAG TECHNOLOGY CO., LTD.

ECN NO.: W0148

APPROVED BY:		CHECKED BY:	Michael Chung	PCB FILE	1DX17MH.PCB

MODEL	DX17F
CIRCUITRY	MAIN BOARD
MAG TECHNOLOGY	SHEET 02 OF 12
	REV: B07
	PCB REV: H
FILE: 0DX7M2-7.SCH	DATE 07/25/94

TO SHEET 8 (W108)
W106
TO SHEET 6 (W110)
W109
TO SHEET 7 (W101)
W101
X-RAY
BLANKING
W101-P3
GND
GND
AFC
+5V
+24V
+12V
-5V
SHEET-1 -5V
SHEET-1 +5V
SHEET-4 AFC
SHEET-4 W101-P3
TO SHEET 9 (VR503) W501
(RED) R
(WHITE) W
(BLACK) B
SHEET-4 -200V
SHEET-1 G1
SHEET-1 +24V
SHEET-1 V-BLK
SHEET-4 TRIGGER
SHEET-1 +190V
SHEET-2.4 FB+ (TO FBT PIN4)
SHEET-1 +12V
SHEET-4 FBT-P14
SHEET-4 FBT-P9
SHEET- -7V/IN
W100 TO SHEET 12 (W060)
R153 1.5K
R191 1K
R194 1.2K 1/4W
R154 1.8K
D113 1N4148
R156 9.53K/M
C139 .1u
C154 220P
R169 100
C135 470P
C140 560P
C141 1u
R150 220 1/4W
R151 10K
R152 1K
ZD104 HZ12A2
Q120 H945P
Q121 H945P
Q122 H945P
R190 1.8K
R155 6.8K
D112 1N4148
C142 .001u
C143 .01u
IC104 NE555P
VCC RES DIS THR OUT TRI CON GND
S13
S14
S15
C157 47u 16V
Q114 H945P
Q115 A733
C145 1u
R100 4.7 1/4W
T102 EI20
R170 33 1/4W
C172 102P 500V
C146 1u
R158 10 1/4W
R159 4.7K 1/4W
Q116 2SK1378
R177 1 1W
ZD105 HZ12A2
L105
D116 30DF6
R178 15K 5W
C147 22u 250V
R193 N.C N.C
Q117 JUMPER
C170 N.C N.C
D123 N.C
D122 N.C
D121 N.C
R157 33K
D114 1N4148
R176 JUMPER
R162 510
IC105 TL082CN
W100
C144 47u 16V
Q112 A673
ZD108 HZ9C1
C148 N.C
C151 0.1u
R163 2.2M
C149 0.056
R164 12K
C165 100u 16V
R773 4.7K
C735 1u
ZD702 HZ6C1
D712 1N4002
C739 100u 35V
R770 2.2K
Q712 H945P
R771 10K
Q711 H945P
ZD701 HZ182
R768 1K
R769 10K
C158 .1u
R174 4.7K
C159 47u 16V
C162 47u 16V
R167 270 1/4W
C153 1u 50V
R173 200K 1/4W
IC105/A TL082CN
ZD106 6C1
VR106 100KB
R172 330K
VR105 100KB
R171 56K
R168 15K
C171 0.1u
R166 10 1/4W
D110 BYT52D
R165 200K
ZD107 HZ6C1
D111 1N4148
R505 33K 1/4W
R549 1K 1/4W
D504 1N4148
R552 2.2K 1/4W
ZD501 HZ5C1
R508 1.2K 1/4W
R550 N.C
R551 2.2K 1/4W
D503 1N4148
R503 1K 1/4W
Q505 8649A
Q502 N.C
R507 10K 1/4W
C504 220u 35V
Q514 A733
R504 200K 1/4W
R509 2.2K 1/2W
C505 .22u 250V
C528 47u 35V
R511 620 1/4W
C506 10u
Q504 8192
D505 1N4148
R510 75 1/4W

美格機密文件
不得複製引用
MAG Confidential
No Copy /Reproduction Allowed

ECN NO.: W0148

NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT, 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.

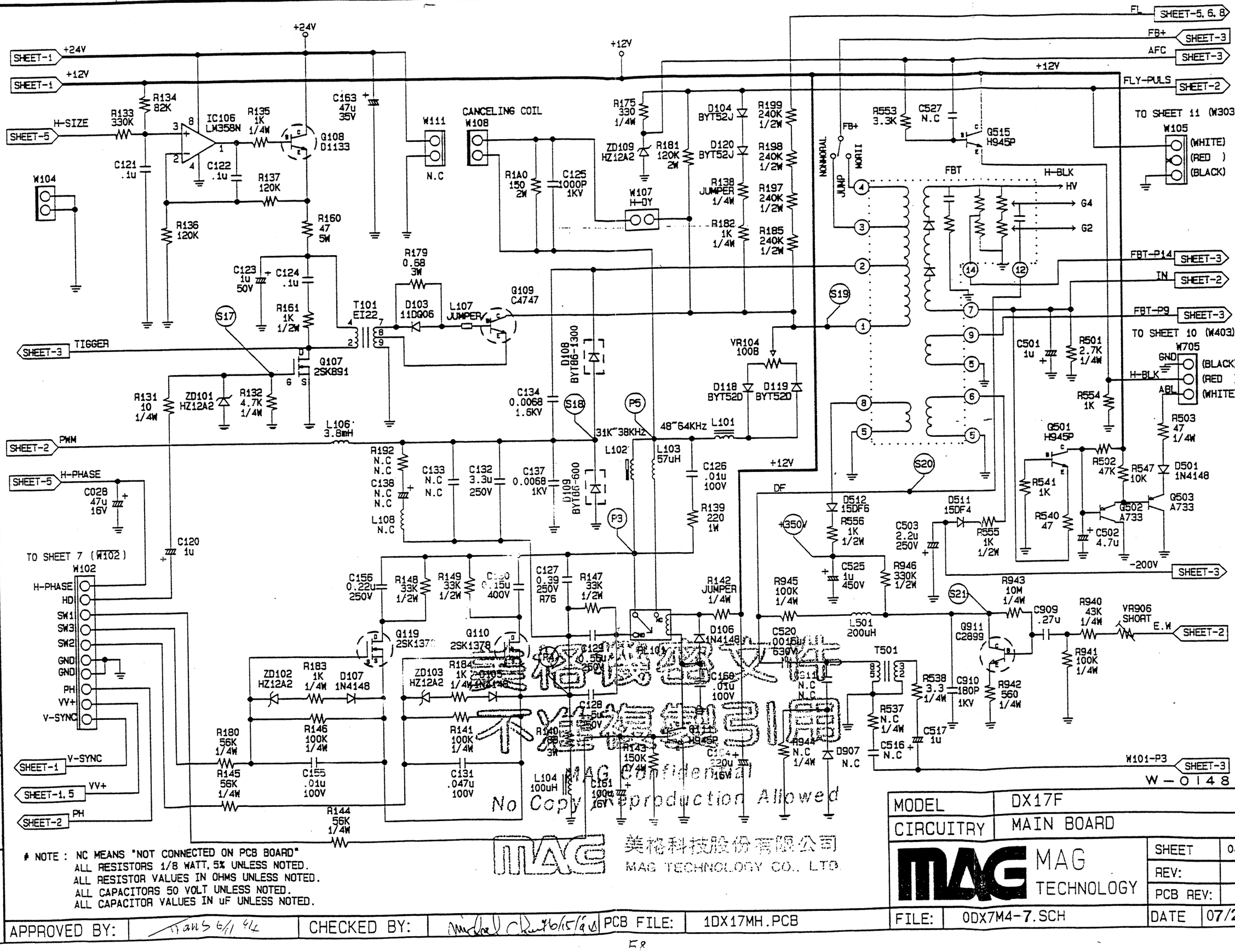
NOTES: IC103, IC104 FOR DC TO DC PROCESS.
IC105 FOR FEED BACK CONTROL & X-RAY CONTROL.
M = METAL/1%

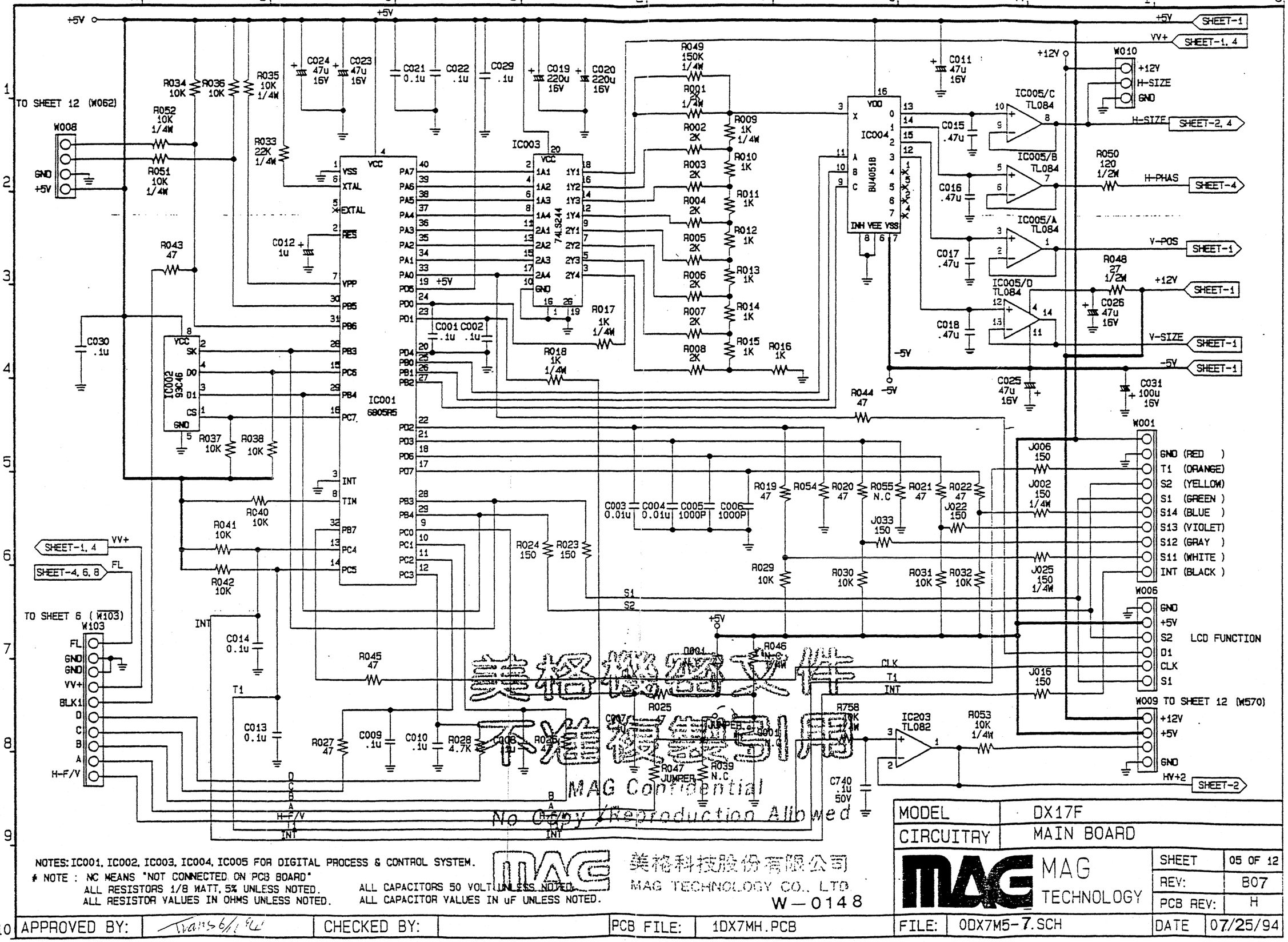
APPROVED BY:		CHECKED BY:		PCB FILE:	1DX7MH.PCB	FILE:	0DX7M3-7.SCH

MODEL	DX17F
CIRCUITRY	MAIN BOARD
SHEET	03 OF 12
REV:	B07
PCB REV:	H
DATE	07/25/94

MAG TECHNOLOGY

美格科技股份有限公司 MAG TECHNOLOGY CO., LTD


+24V
+12V
SHEET-1
SHEET-5
SHEET-3
SHEET-2
H-SIZE
TIGGER
PWM
H-PHASE
V-SYNC
VV+
PH
IC106 LM358N
Q108 D1133
Q107 2SK891
Q109 C4747
Q119 2SK1378
Q110 2SK1378
Q501 H945P
Q515 H945P
Q911 C2899
Q502 A733
Q503 A733
T101 EI22
T501
L101
L102
L103 57uH
L104 100uH
L106 3.8mH
L501 200uH
W104
W105 (WHITE) (RED) (BLACK)
W107 H-DY
W111 N.C
W108 CANCELING COIL
W102
W705 GND (BLACK) H-BLK (RED) ABL (WHITE)
W101-P3
FL
FB+
AFC
FLY-PULS
FBT
H-BLK
HV
G4
G2
FBT-P14
IN
FBT-P9
TO SHEET 11 (W303)
TO SHEET 10 (W403)
TO SHEET 7 (W102)
NONMORAL
JUMP
MORII
S17
S18
S19
S20
S21
P3
P5
31K~38KHz
48~64KHz
DF
+350V
-200V
E.W
VR104 100B
VR906 SHORT
D103 11DQ06
D104 BYT52J
D120 BYT52J
D118 BYT52D
D119 BYT52D
D106 1N4148
D107 1N4148
D108 BYT86-1300
D109 BYT86-600
D501 1N4148
D512 15DF6
D511 15DF4
D907 N.C
ZD101 HZ12A2
ZD102 HZ12A2
ZD103 HZ12A2
ZD109 HZ12A2
R133 330K
R134 82K
R135 1K 1/4W
R136 120K
R137 120K
R138 JUMPER 1/4W
R139 220 1W
R140 68 3W
R142 JUMPER 1/4W
R143 150K 1/4W
R144 56K 1/4W
R145 56K 1/4W
R146 100K 1/4W
R147 33K 1/2W
R148 33K 1/2W
R149 33K 1/2W
R160 47 5W
R161 1K 1/2W
R175 330 1/4W
R179 0.68 3W
R180 56K 1/4W
R181 120K 2W
R182 1K 1/4W
R183 1K 1/4W
R184 1K 1/4W
R185 240K 1/2W
R197 240K 1/2W
R198 240K 1/2W
R199 240K 1/2W
R1A0 150 2W
R131 10 1/4W
R132 4.7K 1/4W
R141 100K 1/4W
R192 N.C
R138 3.3 1/4W
R537 N.C 1/4W
R540 47
R541 1K
R547 10K
R553 3.3K
R554 1K
R555 1K 1/2W
R556 1K 1/2W
R940 43K 1/4W
R941 100K 1/4W
R942 560 1/4W
R943 10M 1/4W
R944 N.C 1/4W
R945 100K 1/4W
R946 330K 1/2W
R501 2.7K 1/4W
R502 47K
R503 47 1/4W
C028 47u 16V
C120 1u
C121 .1u
C122 .1u
C123 1u 50V
C124 .1u
C125 1000P 1KV
C126 .01u 100V
C127 0.39 250V R76
C128 1.5u 250V
C129 0.56u 250V
C131 .047u 100V
C132 3.3u 250V
C133 N.C
C134 0.0068 1.6KV
C137 0.0068 1KV
C138 N.C
C150 .01u 100V
C155 .01u 100V
C156 0.22u 250V
C160 0.15u 400V
C161 100u 16V
C163 47u 35V
C501 1u
C503 2.2u 250V
C502 4.7u
C511 N.C
C516 N.C
C517 1u
C520 .0015u 630V
C525 1u 450V
C527 N.C
C909 .27u
C910 180P 1KV
C154 220u 16V
NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT, 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.
MAG Confidential
No Copy Reproduction Allowed
美格科技股份有限公司
MAG TECHNOLOGY CO., LTD.
MODEL DX17F
CIRCUITRY MAIN BOARD
MAG TECHNOLOGY
SHEET 04 OF 12
REV: B07
PCB REV: H
APPROVED BY:
CHECKED BY:
PCB FILE: 1DX17MH.PCB
FILE: 0DX7M4-7.SCH
DATE 07/25/94
W-0148



NOTES: IC001, IC002, IC003, IC004, IC005 FOR DIGITAL PROCESS & CONTROL SYSTEM.

NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"

ALL RESISTORS 1/8 WATT, 5% UNLESS NOTED.

ALL RESISTOR VALUES IN OHMS UNLESS NOTED.

ALL CAPACITORS 50 VOLT UNLESS NOTED.

ALL CAPACITOR VALUES IN uF UNLESS NOTED.

MAG Confidential
No Copy / Reproduction Allowed

美格科技股份有限公司
MAG TECHNOLOGY CO., LTD
W—0148

MODEL	DX17F		
CIRCUITRY	MAIN BOARD		
MAG TECHNOLOGY	SHEET	05 OF 12	
	REV:	B07	
	PCB REV:	H	
APPROVED BY: Trans 6/1 94	CHECKED BY:	PCB FILE: 1DX7MH.PCB	FILE: 0DX7M5-7.SCH
			DATE 07/25/94

FROM SHEET 10 (W403)
+5V
(BLACK) SOG
(YELLOW) CLP
(WHITE) HS
(BLACK) GND
(RED) VS
C736 47u 16V
C737 .1u
R718 N.C
R719 N.C
R720 N.C
R721 560
R722 N.C
R706 N.C N.C
IC703/D N.C
IC703/B N.C
IC703/A N.C
IC703/C N.C
C709 JUMPER
R746 N.C
R747 N.C
JUMPER
R702 6.8K
R701 1K
Q701 H945P
C701 .001u
D
A
CLP
H-SYNC
BLK1
FL
SHEET-1
SHEET-7
SHEET-8
SHEET-4, 5, 8
FROM SHEET 5 (W103)
W103
FL
GND
GND
VV+
BLK1
D
C
B
A
H-F/V
VR701 10KB
R726 12K/M
C710 .001u
PC74HC4538P IC704/B
R727 10K
T2
S22
S23
C712 2.2u
IC701/D 74HC86
R703 1.2K
C702 47u 16V
R705 33K
R707 56K
C703 150P
C704 68P
IC701/C 74HC86
D701 1N4148
R708 2.2K
IC701/B 74HC86
IC702/A 74HC86
IC702/B 74HC86
R709 47K
R717 2.2K 1/4W
Q704 H945P
C708 10u
IC702/C 74HC86
R716 2.2K 1/4W
IC702/D 74HC86
FROM SHEET 3 (W109)
W110
R712 560
R710 6.8K
R711 1K
Q702 H945P
C705 .001u
IC701/A 74HC86
R713 1.2K
C706 100u 16V
R714 100
R715 4.7K
Q703 H945P
D702 1N4148
C707 10u
R734 33K
V-SYNC
SHEET-7
VR702 10KB
R730 46.4K/M
C713 .22u
PC74HC4538P IC704/A
R731 10K
T1
R732 10K
C714 4.7u
VV+
SHEET-7
FROM SHEET 3 (W106)
W106
+12V
SHEET-1
R723 N.C
D703 N.C
Q705 N.C
D704 N.C
R724 N.C
R725 N.C

74HC86		
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

74LS38		
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

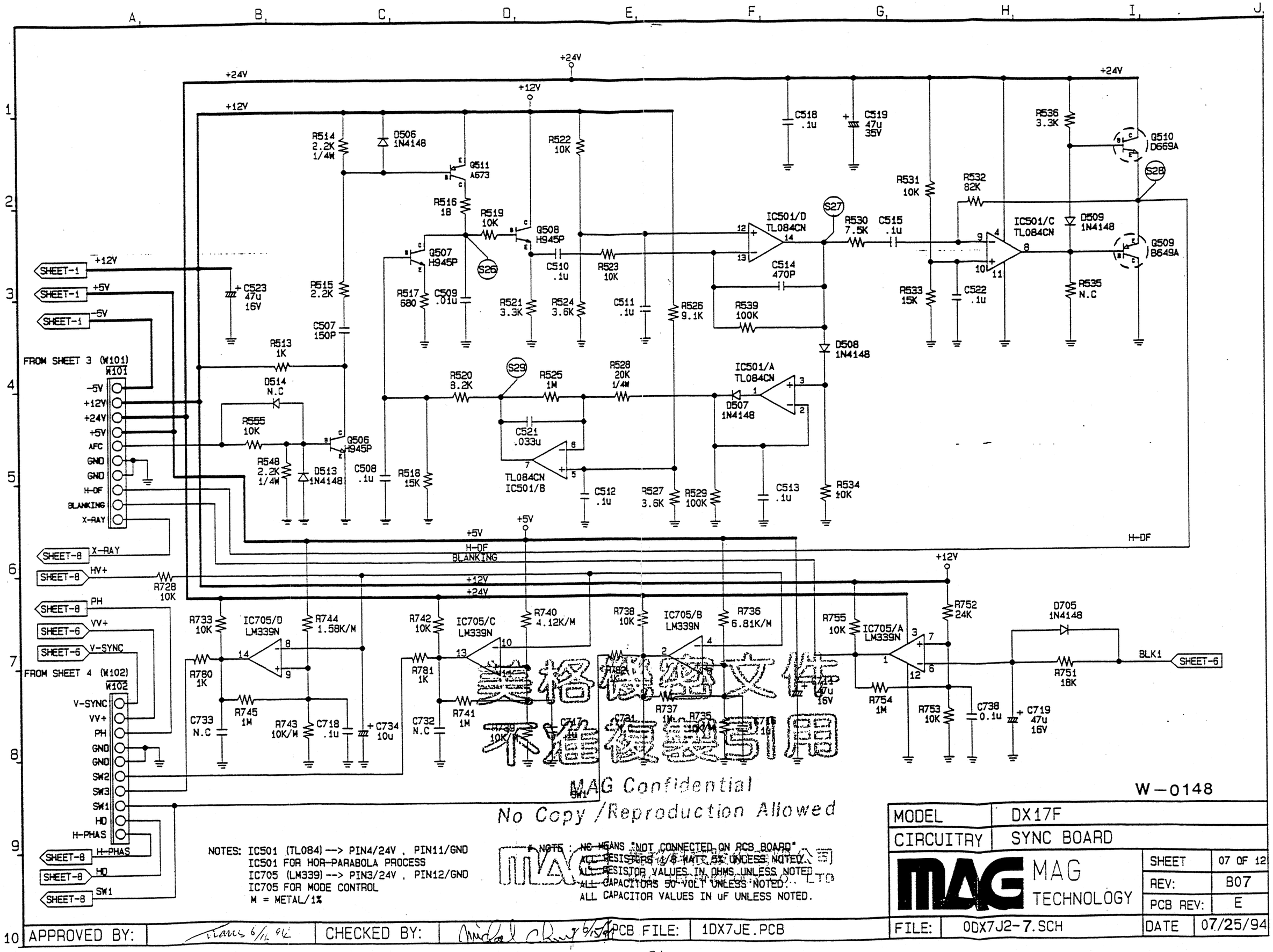
NOTES:
IC701 (74HC86) —> PIN14 / +5V , PIN 7 / GND
IC702 (74LS86) —> PIN14 / +5V , PIN 7 / GND
IC703 (74LS38) —> PIN14 / +5V , PIN 7 / GND
IC704 (74HC4538) ->PIN16 /+5V , PIN 8 / GND
IC701, IC702, IC703 FOR SYNC PROCESS
IC704 FOR HOR & VER F/V PROCESS
M = METAL/1%

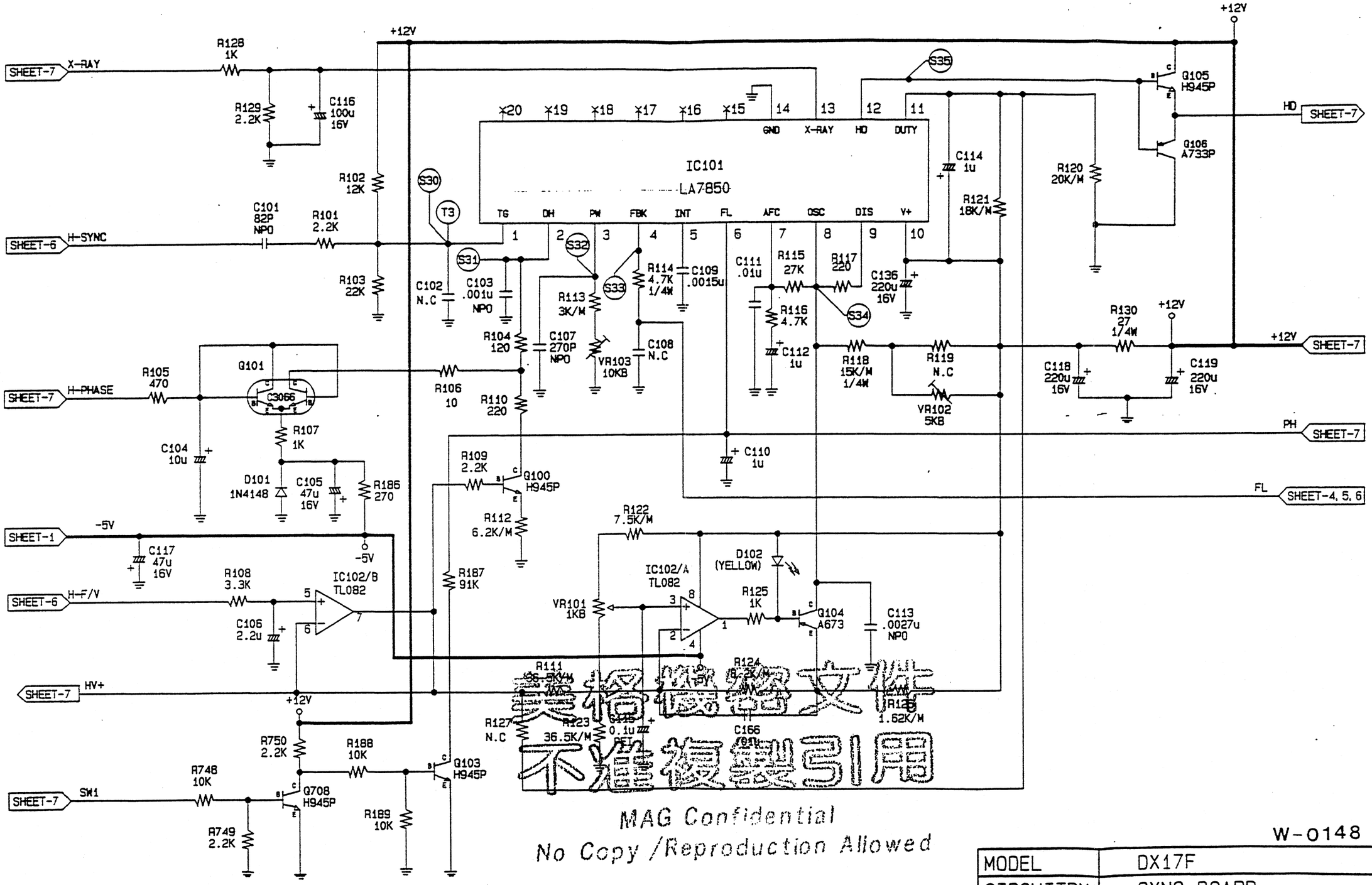
NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN UF UNLESS NOTED.

美格機密資料
不得複製引用
MAG Confidential
No Copy / Reproduction Allowed
美格科技股份有限公司
MAG TECHNOLOGY CO., LTD

W-0148

MODEL	DX17F		
CIRCUITRY	SYNC BOARD		
MAG TECHNOLOGY	SHEET	06 OF 12	
	REV:	B07	
	PCB REV:	E	
APPROVED BY: Trans 9/6/94	CHECKED BY: Nicka 9/5/94	PCB FILE: 1DX7JE.PCB	FILE: 0DX7J1-7.SCH
			DATE 07/25/94


+24V
+12V
+5V
-5V
SHEET-1
SHEET-8
SHEET-6
FROM SHEET 3 (W101)
W101
FROM SHEET 4 (W102)
W102
-5V
+12V
+24V
+5V
AFC
GND
GND
H-DF
BLANKING
X-RAY
V-SYNC
VV+
PH
GND
GND
SW2
SW3
SW1
HD
H-PHAS
R514 2.2K 1/4W
D506 1N4148
Q511 A673
R516 18
R519 10K
Q508 H945P
Q507 H945P
R522 10K
R515 2.2K
C507 150P
R513 1K
D514 N.C
R555 10K
Q506 H945P
R548 2.2K 1/4W
D513 1N4148
C508 .1u
R518 15K
C523 47u 16V
R517 680
C509 .01u
C510 .1u
R523 10K
R521 3.3K
R524 3.6K
C511 .1u
R526 9.1K
S26
S27
S28
S29
C518 .1u
C519 47u 35V
R530 7.5K
C515 .1u
C514 470P
R539 100K
D508 1N4148
IC501/D TL084CN
R531 10K
R532 82K
R536 3.3K
Q510 D669A
D509 1N4148
Q509 B649A
IC501/C TL084CN
R533 15K
C522 .1u
R535 N.C
R520 8.2K
R525 1M
R528 20K 1/4W
C521 .033u
TL084CN IC501/B
C512 .1u
R527 3.6K
R529 100K
C513 .1u
R534 10K
IC501/A TL084CN
D507 1N4148
R728 10K
R733 10K
IC705/D LM339N
R744 1.58K/M
R780 1K
R745 1M
C733 N.C
R743 10K/M
C718 .1u
C734 10u
R742 10K
IC705/C LM339N
R740 4.12K/M
R781 1K
R741 1M
C732 N.C
R739 10K/M
C717
R738 10K
IC705/B LM339N
R736 6.81K/M
R782 1K
R737 1M
R735 100K/M
C731
C716
R755 10K
IC705/A LM339N
R752 24K
D705 1N4148
R754 1M
R753 10K
C738 0.1u
C719 47u 16V
R751 18K
BLK1
SW1
NOTES: IC501 (TL084) --> PIN4/24V , PIN11/GND
IC501 FOR HOR-PARABOLA PROCESS
IC705 (LM339) --> PIN3/24V , PIN12/GND
IC705 FOR MODE CONTROL
M = METAL/1%
* NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.
MAG Confidential
No Copy /Reproduction Allowed
W-0148
MODEL DX17F
CIRCUITRY SYNC BOARD
MAG TECHNOLOGY
SHEET 07 OF 12
REV: B07
PCB REV: E
APPROVED BY:
CHECKED BY:
PCB FILE: 1DX7JE.PCB
FILE: 0DX7J2-7.SCH
DATE 07/25/94



MAG Confidential
No Copy /Reproduction Allowed
不得複製引用

NOTES: IC101 (LA7850) --> PIN10/VCC , PIN14/GND
IC102 (LM358) --> PIN 8/VCC , PIN4/ GND
IC101, IC102 FOR HOR-OSC & PHASE PROCESS
M = METAL/1%

* NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD".
ALL RESISTORS 1/8 WATT 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.

MAG 美格科技股份有限公司 TECHNOLOGY CO., LTD

W-0148

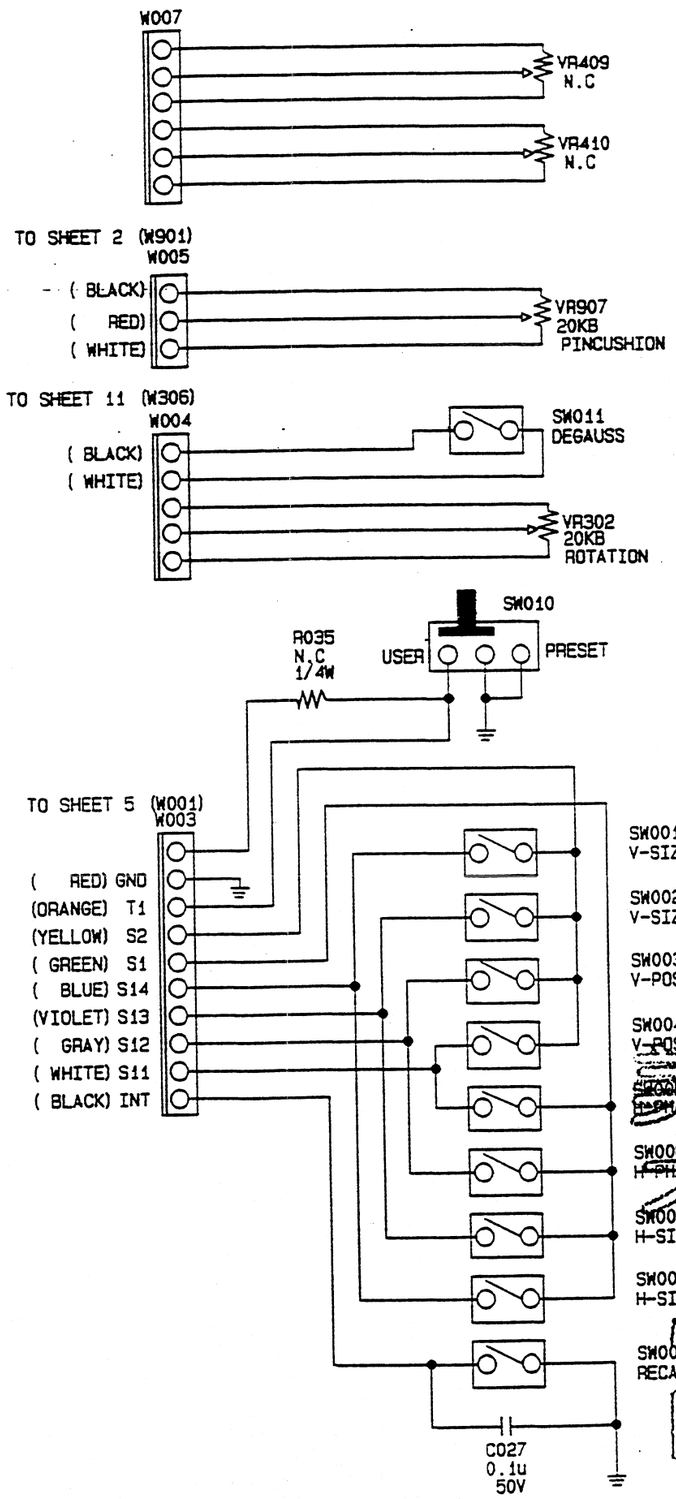
MODEL	DX17F
CIRCUITRY	SYNC BOARD

MAG TECHNOLOGY

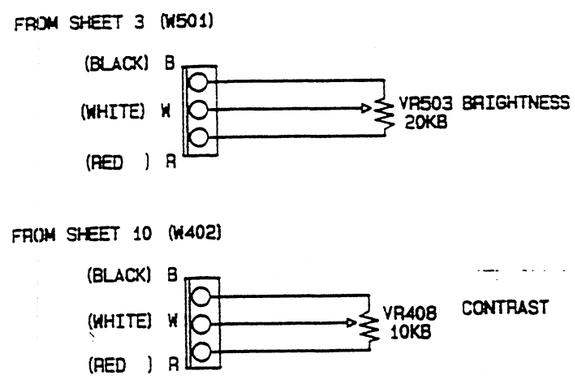
SHEET	08 OF 12
REV:	B07
PCB REV:	E
DATE	07/25/94

APPROVED BY:	CHECKED BY:	PCB FILE:	FILE:
		1DX17JE.PCB	0DX7J3-7.SCH

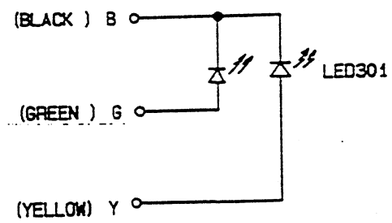
CONTROL BOARD



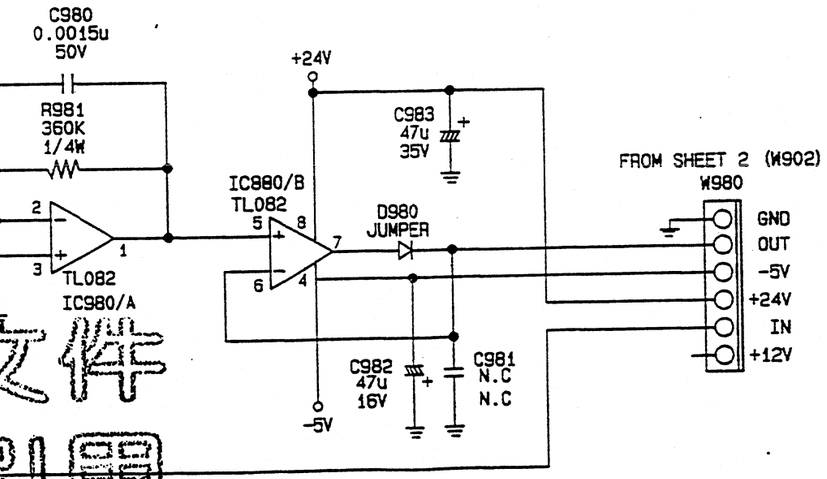
VR BOARD



LED BOARD



SAMPLE BOARD



美格機密文件
不得複製引用
MAG Confidential
No Copy /Reproduction Allowed

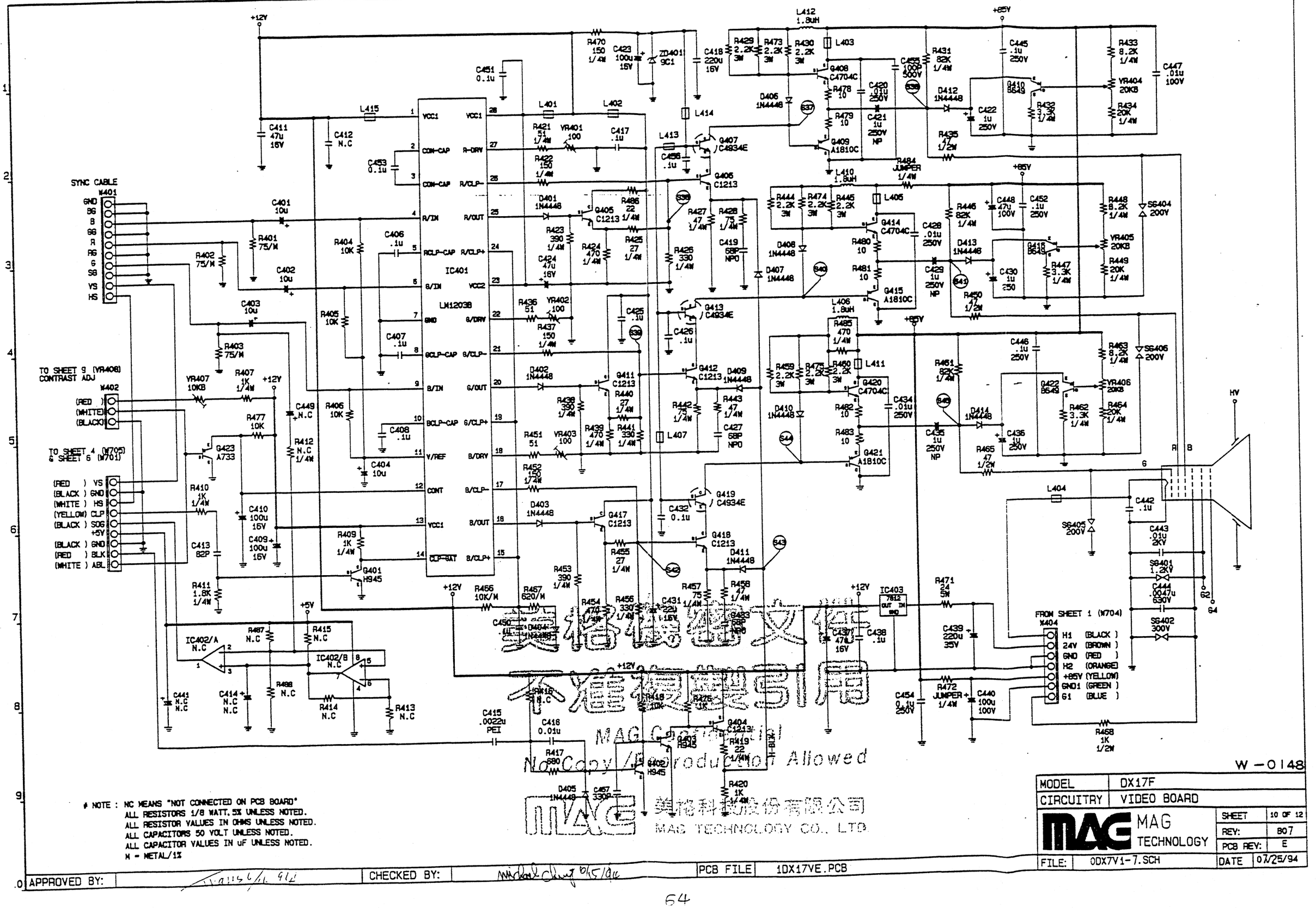
MAG 美格科技股份有限公司
MAG TECHNOLOGY CO., LTD.

W-0148

MODEL	DX17F
CIRCUITRY	CONTROL & VR & LED & SAMPLE BOARD
MAG TECHNOLOGY	SHEET 9 OF12
	REV: B07
	PCB REV: C, A, B, B
FILE: ODX7S1-7.SCH	DATE 07/25/94

APPROVED BY: CHECKED BY: PCB FILE: 1DX17SC.PCB & 1DX17QA.PCB 1DX17XB.PCB & 1DX17WB.PCB

NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"



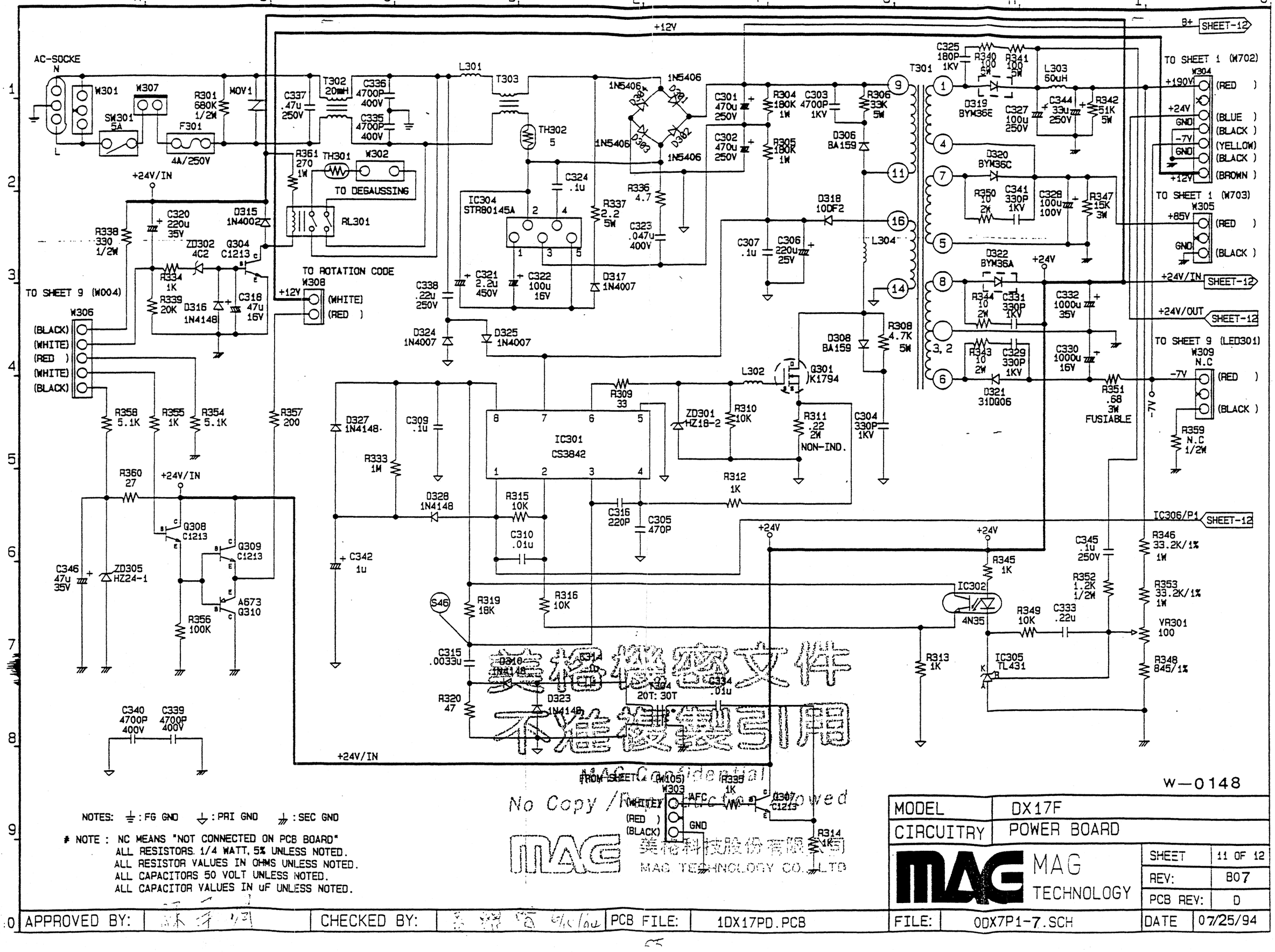
NOTE : NC MEANS "NOT CONNECTED ON PCB BOARD"
ALL RESISTORS 1/8 WATT, 5% UNLESS NOTED.
ALL RESISTOR VALUES IN OHMS UNLESS NOTED.
ALL CAPACITORS 50 VOLT UNLESS NOTED.
ALL CAPACITOR VALUES IN uF UNLESS NOTED.
M = METAL/1%

MAG 美格科技股份有限公司
MAG TECHNOLOGY CO., LTD.
No Copy / Reproduction Allowed

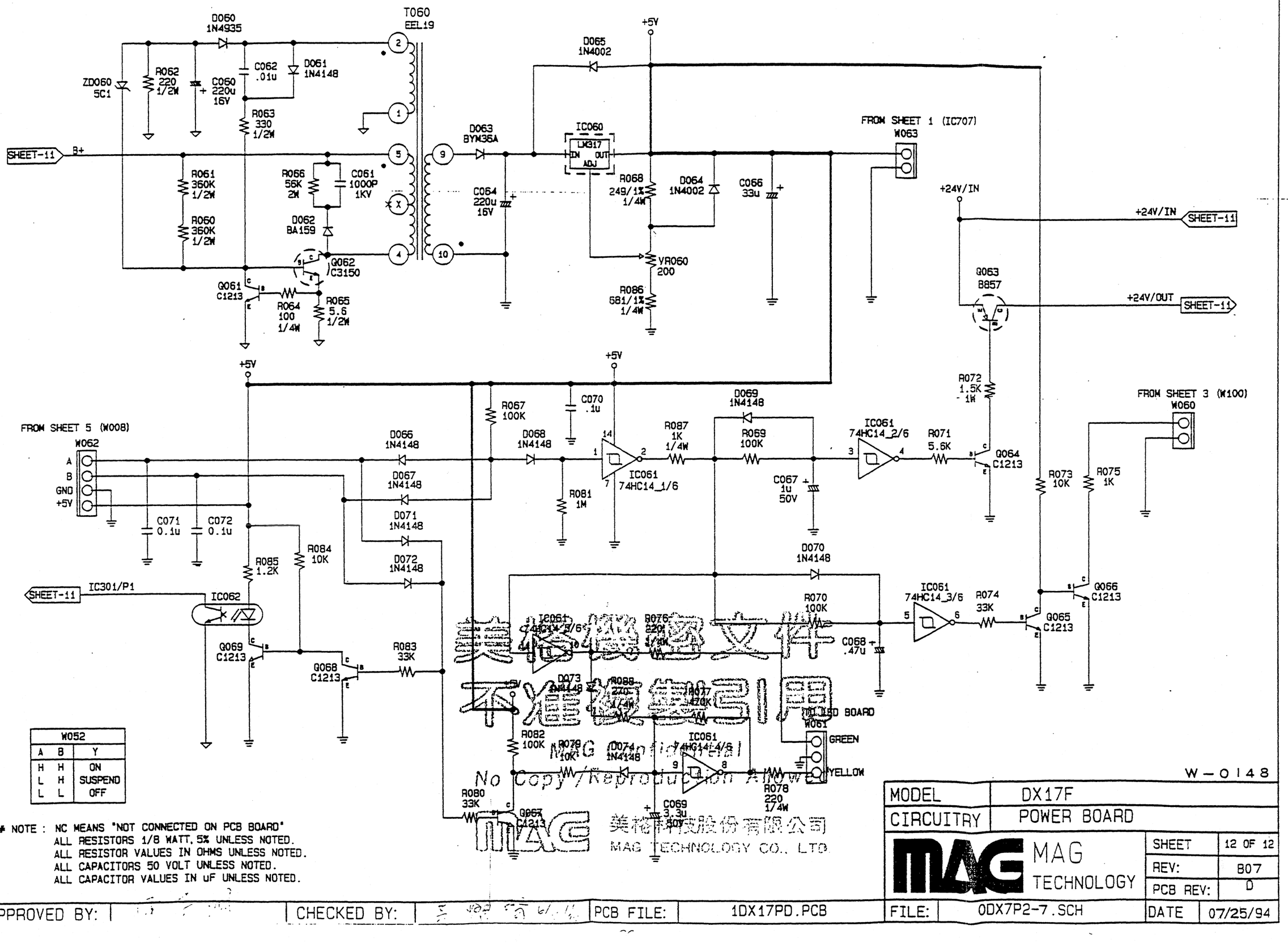
W-0148

MODEL	DX17F		
CIRCUITRY	VIDEO BOARD		
MAG TECHNOLOGY		SHEET	10 OF 12
		REV:	B07
		PCB REV:	E
FILE:	0DX7V1-7.SCH	DATE	07/25/94

APPROVED BY:		CHECKED BY:		PCB FILE	1DX17VE.PCB



MAG Confidential
No Copy / Reproduction Allowed
MAG TECHNOLOGY CO., LTD



MAG Confidential
No Copy/Reproduction Allowed
美格科技股份有限公司
MAG TECHNOLOGY CO., LTD.